

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL.

EDITED BY
THE HONORARY SECRETARIES.



JANUARY TO DECEMBER,
1876.

(With three plates and two woodcuts.)



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Pl. III (p. 184) *Amphistoma hominis*, a new parasite affecting man.

WOODCUTS.

- Page 91. Gold coin of Náçir-uddín Mahmúd Sháh of Dihlí.
,, 185. *Amphistoma hominis*, longitudinal section.

ERRATA

IN

PROCEEDINGS, ASIATIC SOCIETY OF BENGAL, FOR 1876.

- Page 7, l. 12 from below. *Add*—It is perhaps better to take *rakhsā* in its usual meaning and translate, 'Akbar is that king whose steed passes &c.'
,, 70, last line, *for* Tweena *read* Ttoon.
,, 104, l. 17, *for* W. C. McGregor *read* W. McGregor.
-

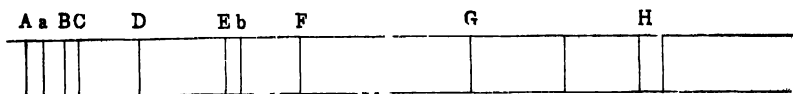


Fig. 1 Solar Spectrum

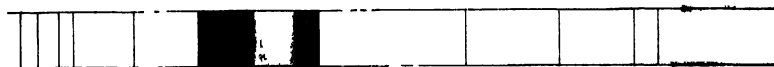


Fig. 2 Absorption Spectrum of Eosin in weak Watery solution

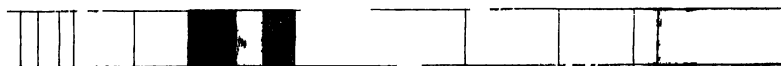


Fig. 3 Absorption Spectrum of Eosin in weak Alcoholic solution

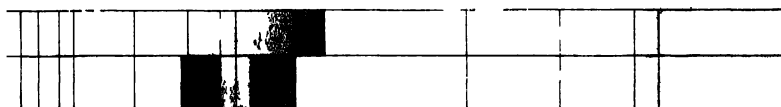


Fig. 4 Absorption Spectrum of Stained Bromo-iodine

(1 Non Fluorescent 2 Fluorescent)



Fig. 5 Spectrum as photographed on stained dry bromide plate

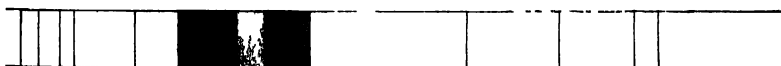


Fig. 6 Absorption Spectrum of stained bromo-iodised Collodion



Fig. 7 Spectrum as photographed on stained wet bromo-iodide plate



Fig. 8 Spectrum as photographed on unstained wet bromo-iodide plate



KHOND WAR-AXES

one-tenth natural size.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JANUARY, 1876.

The Monthly General Meeting of the Asiatic Society was held on Wednesday, the 5th January, 1876, at 9 o'clock P. M.

T. Oldham, Esq., LL. D., President, in the chair.

The Minutes of the last meeting were read and confirmed.

The following presentations were announced—

1. From Dr. D. Brandis, a copy of "The Forest Flora of North-West and Central India."

2. From Capt. J. Waterhouse, a copy of his "Report on the Operations connected with the Observation of the Total Solar Eclipse of April 6th, 1875, at Camorta in the Nicobar Islands."

3. From Rājah Jai Kishn Dās, a copy of the Rig Veda Sanhita Bhashya by Pandit Dyananda Saraswati.

4. From W. H. Dall, U. S. Coast Survey, through the Rev. C. H. Dall, a copy of a "Report on Mt. St. Elias."

The President, seeing the Rev. C. H. Dall present, asked him to explain the objects of his son's paper—

MR. DALL said: At the call of our President, I will say a few words of the pamphlet on the table. It details a careful re-measurement of one of the highest mountains in North America, Mt. St. Elias; decidedly the highest in that north-western portion of the continent which Russia ceded to the United States in June 1867, for about a million and a half sterling. Dr. Oldham has made kindly reference to what he is pleased to call the repeated indebtedness of this Society to the same donor,—a son of mine William H. Dall, Acting Assistant, United States Coast Survey, who is getting to be known as the explorer of Alaska (Russian America), to the development of which country he has devoted the best part of a dozen years. The Government have left him in sole charge of this survey and exploration, and have given him, besides other means and appliances of discovery, first

one and then another vessel, the "Humboldt" and the "Yukon," specially built for the often dangerous work of sailing among unknown reefs and currents, and charting out (a dozen or more) good harbours, just now opened to commerce. One test of the general success of this work is found in the fact that Alaska has already paid back more, I think, than twenty per cent. of its cost to the United States. I may here say that when I was leaving America, less than three months ago, Mr. Dall gave me for this Society an Atlas of twenty-four new charts and maps of his, just published in good style, by the Coast Survey Department. These maps are coming to Calcutta, with other books, round the Cape. The Asiatic Society need hardly be reminded that the best surveys of the N. West coast of the American continent, antedating those of Mr. Dall, were made a century ago,—of course with instruments inferior to those we now possess,—by the faithful and able French explorer La Perouse. If I am rightly informed, he trusted mainly to observations taken with his quadrant or sextant; and generally from the deck of his ship. Important changes and adjustments must come of the instruments and facilities of observation that are ours to-day. These make it no wise incredible that Mr. Dall's rectifications of latitude and longitude should have shifted the whole coast line from 3 to 5 leagues westward, for hundreds of miles;—added eight hundred square miles to *British* (the Hudson's Bay) territory, and done many other things besides lifting Mt. St. Elias from being "13,000 feet high" to a clear elevation of over 19,000 feet. The quarto pamphlet, of thirty-two pages, now on the table, records attempts to measure the mountain, as made by several travellers since the time of La Perouse, and gives the results of sixty-four observations of it, taken by Mr. Dall, with better instruments, on sea and shore. The final working out of these has been done, with extra care, at his present home, and for the last ten years his hailing-point, the Smithsonian Institution in Washington, D. C.

Thanking the Chairman for his call upon me, I do not doubt that it will encourage and cheer the author of this pamphlet to learn that his persistent sacrifice of home and society for science, natural and geographical, from his nineteenth year, has the approving sympathy of the President and Members of this Society.

The following gentlemen duly proposed and seconded at the last meeting, were balloted for and elected ordinary members—

W. McGregor, Esq.

Ottokar Feistmantel, Esq., M. D.

The following are candidates for ballot at the next meeting—

R. B. Shaw, Esq., late British Resident at Kashgar, proposed by Dr. J. Scully, seconded by Capt. J. Waterhouse.

Col. J. F. Tennant, R. E., Calcutta, for re-election, proposed by Col. Hyde, seconded by Capt. J. Waterhouse.

G. E. Knox, Esq., O. S., Major H. H. Mallock, and Lieut. H. B. Urmston, have intimated their desire to withdraw from the Society. ♦

The President laid before the meeting a statement from the Council regarding certain proceedings in connection with the rejection of a gentleman proposed by the Council for election as an Honorary Member, which was taken as read and ordered to be circulated to the members with the Proceedings.

The following letter from Major-General Sir A. P. Phayre, K. C. S. I., K. C. B., Governor of the Mauritius, to Mr. Blochmann, was read—

November 10th, 1875.

MY DEAR SIR,—I observe in the Proceedings of the Asiatic Society for June 1875, a paper by Mr. V. Ball on stone implements of the Burmese type found in the district of Singbhúm. I beg to bring to your notice, that the stone weapons hitherto sent from Burma, have, I believe, all been found within the limits of the territory, in the delta and valley of the lower Eráwati, occupied from time immemorial by the Taláing or Mun people. The language of the Mun race of Pegu, is connected with that of the Ho or Mundá people of Chutiá Nágpur, called Kol. I beg on this subject to refer to my paper on the History of Pegu in the Society's Journal, Volume XLII of 1873.

The form of the stone implements remarked on by Mr. Ball, tends to indicate a connection in race, or intercourse in pre-historic time, between the Kols and the Mun of Pegu. The supposed origin of these weapons as thrown to earth in the lightning flash, is, as remarked by Mr. Theobald, the same among both peoples.

MR. WOOD-MASON exhibited specimens and read descriptions of several new or little-known species of phasmideous insects, amongst which were the following :

Phibalosoma Westwoodi, n. sp. ♀, from Nazírah and Sámágúting, *Asám*.

Lopaphus Iolas, Westw., ♂ ♀, from Johore in the Malay peninsula.

Lonchodes Austeni, n. sp., ♂, from the Dikrang valley, *Asám*.

Phyllium Celebicum, De Haan, ♀, from Karennee.

Phyllium siccifolium, Lin., ♀, from Mauritius.

Phyllium Westwoodi, n. sp., ♂ ♀, from S. Andaman and Pahpoon.

And of the following two new species of goliathideous beetles :

Heterorrhina Roepstorffii, ♂ ♀, from S. Andaman.

Heterorrhina annectans, ♂ ♀, from Sikkim.

Mr. Wood-Mason also exhibited specimens of a new species of freshwater *Astacidae* from New Zealand, for which he proposed the name *Astacoides tridentatus* from the presence of three spines on the inferior edge of the rostrum, arranged and shaped like the teeth of a saw. He denied the existence of any special relationship between the New Zealand species of freshwater *Astacidae* and the marine genus *Nephrops*, from which they differed, as indeed did all freshwater crayfish whatsoever, in having the last abdominal somite freely movable upon the preceding, and in having, like the species of the genus *Astacoides*, no appendages to the first and the appendages to the second post-abdominal somite similarly constructed to those of the following ones even in the male. Under these circumstances and as the species referred to *Paranephrops* differed less from those of *Astacoides* than these latter did from one another, and as, moreover, the latter name had priority,* he proposed, provisionally, to refer the New Zealand species of *Astacidae* to it.

In continuation of his readings and translations of Arabic and Persian inscriptions, Mr. Blochmann exhibited the following from Dihlí, Rohtás, and Sahasráram. The Dihlí rubbings belonged to the batch received from Mr. Delmerick; those from Rohtás were taken by Mr. J. D. Beglar and were given to the Society, together with two rubbings from Sahasráram, by Major-General A. Cunningham, C. S. I.

I.

From the Rauzah Mirzá Muqím (*vide* Proceedings for December, 1875), in the niche of the gate of the Dargáh of Nizámuddín, south. *Ru-bá'í* metre.

فرزند مقیم بندۂ حق قدیم * جا کرد درین روضۂ پر فیض و نعیم
 اورا نبود ز شر اندیشه و بیم * چون ساکن فردوس برین گشت مقیم
 قایله نویدے کا . . . حسین . . .
 آنها کہ بکوی قرب جا یافته اند * کام دل خود بدمعا یافته اند
 این مرتبه دانی ز کجا یافته اند * از شیخ نظام اولیا یافته اند
 قایله مہر نویدے نشاپوری ۹۹

1. The boy Muqím, the slave of the living and eternal God, dwells in this manse-
 leum which is full of bliss and beauty.

* *Astacoides*, Guérin, 'Revue Zoologique,' 1839, p. 109.

Paranephrops, White, Gray's Zool. Miscellany, 1842, p. 78; and Dieffenbach's
 New Zealand, 1843, vol. II, p. 267.

2. He has no thought nor fear of sin; for the dweller of the highest paradise has taken his place (here).

Composed by Nawedī, [written] by Husain.

1. Those who dwell in the lane of vicinity [to Nizām's tomb], have gained for their object the desire of their heart.

2. Dost thou know how they have obtained this high degree? They have obtained it from Shaikh Nizām Auliya.

A. H. 969 [A. D. 1561-2]. Composed by Mīr Nawedī of Nishāpūr.

II.

From a tomb inside the enclosure of Nizāmuddīn, West. 1 ft. 8 in. by 8½ in.

ابن لوح باسم مرحوم مغفور خواجه دوست محمد که در جوانی (۹) شهید شد
سنة سبعین و تسعایه تحریر فی الشهر مغربام شد ॥

This tablet is erected in memory of the late Khwājah Dost Muhammad, who has obtained forgiveness. He was killed in . . . , in 970. Written in the month of Qaṣar [October, 1562].

The illegible word may be جوانی, youth; but it may also be a geographical name.

III.

From outside Nizāmuddīn's tomb, West. 1 ft. 2 in. by 6 in.

در سنة نهمه هفتاد پنج مرحومي محمد امين سلطان در چتور شهيد شده ॥

In the year 975 [A. D. 1567-8], the late Muhammad Amin Sulṭān was killed before Chitor.

Regarding the siege of Chitor, *vide* the next inscription.

IV.

From a tomb in a *gumbaz* near the Kadam Sharif. 1 ft. 2 in. by 7 in.

مرحوم نواب آصفخان بتاريخ بیست و پنجم شهر شوال بر روز جمعه فی سنة ۹۷۶ ॥

The late Nawāb Aṣṣaf Khān [died] on Friday, 25th Shawwāl, 976 [12th April, 1569].

His biography will be found in my *Ā'in Translation*, I, p. 368. After the fall of Chitor (25th Sha'bān, 975), Aṣṣaf Khān was appointed governor of the fort. The year of his death was hitherto unknown.

V.

From a tomb outside Nizāmuddīn, West. 1 ft. 1 in. by 6½ in. *Rubd'* metre; but the *nūn* in *dīn* (last line) is used as a *nūn i ghunnah*.

چون کرد علا الدین محمد نقل * از دار فنا جانب فردوس شتات
تاریخ وفاتش همه کسی می جستند * عظم بچنان رفت علا الدین یات

1. When 'Alá uddín Muḥammad left and hastened from the perishable abode towards paradise,

2. All people searched for a chronogram, and my genius found one in the words "Aláuddín went to paradise".

This gives 982 H., or A. D. 1574.

VI.

From a tomb within the courtyard (*ṣahn*) of Amír Khusrau's Dargáh, S. 1 ft. 2 in. by 6½ in.

نواب نظر بہادر خان در روز عاشورا سنہ نہصد و ہشتاد و دو بود کہ شہادت یافت //

Nawáb Nazar Bahádur Khán was killed on the 'Ashúrá day [10th Muharram] of the year 982.

This would be the 2nd May, 1574. Nawáb Nazar Bahádur was killed in Orísá; *vide* Aín Translation, I, 374. Hence the memorial tablet appears to bear a wrong year; for Nazar Bahádur was killed in 983.

VII.

From an old Masjid near the Dihlí Jail, within the enclosure of certain old walls, called 'Mahábat Khán kí Hawelí', on the road to Nizámuddín. A beautiful inscription, 3 ft. 6 in. by 2 ft. 4 in. The inscription was composed by the renowned Faizí, the brother of Abul Fazl, for a mosque built by Shaikh 'Abdunnabí, the enemy of his father; *vide* Abul Fazl's biography in my Aín Translation, I, p. XV, and p. 546. Metro, *Rhaffif*.

فی زمان الخلیفۃ الاکبر * ابد الله البقاع
قد بنی بقعة مقدسة * مثلها لا يكون فی الاقطاع
شیخ اسلام زائر الحرمین * شیخ اهل حدیث بالاجماع
شیخ عبد النبی نعمانی * معدن العلم منبع الانفاع
سال تاریخ این بنا فیضی * سأل العقل قال خبر بقاع
کنہ .. نقشی

1. In the time of the greatest [*akbar*] Sovereign—May God perpetuate.....—

2. A sacred mosque, the like of which will not be found in the countries, was built

3. By the Shaikh of Islám, the visitor of both pilgrimages, the Shaikh of the people of the tradition by consent,

4. Shaikh 'Abdunnabí, the bestower of benefits,* the mine of knowledge, the source of advantages.

5. Faizí asked Genius for a chronogram for this building, and he answered, "The best of religious edifices". Written by.....

* *Na'mat*, from *na'md*, a benefit, in allusion to his office as Qadr, or bestower of religious benefits and lands.

This gives 988 H., i. e. A. D. 1576-6, or four years before 'Abdunnabi's banishment to Makkah.

VIII.

From a Mosque at Sarái Dáúd, near 'Chirágh i Dihlí', 1 ft. 2 in. by 11 in.

در زمانه حضرت جلال الدین محمد اکبر بادشاه بانی مسجد و قبر چندن خواجسره
(sic) سیدل ابن علاو الدین ابن الہیہ حلوی سنہ ۹۹۴ھ نہصد و نود و چہار
بمبلغ سیصد روپیہ ۱۱

In the time of his Majesty Jaláluddín Muhammad Akbar Bádisháh. The builder of the Mosque and the tomb is Chandan, [i. e.] the Eunuch Sandal, son of 'Aláuddín, son of Alhiah, the sweetmeat-maker. A. H. 994 [A. D. 1586], at a cost of 300 Rupees.

Fort Rohtás, in South Bihár.

Mr. Beglar took rubbings of the following inscriptions—

I.

From a loose stone from a Mosque, now in the palace of Rohtás, 1 ft. 10 in. by 2 ft. 10 in. Metre, *Khafif*.

لا اله الا الله محمد رسول الله
اکبر غازی آنکه از رفعت • میکند رخسار او بگردون میر
در زمان چنین شهنشاهی • که بفرمان اوست وحش [و] طیر
بود در خاطر این حبش خان را • که کند مسجد از برای خیر
سال تاریخ مسجد عالی • شد ز روی حساب بقعه خیر
در تاریخ شهر رجب سنہ ۹۸۶
نصر من الله و فتح قریب و بشر المؤمنین ۱۱

1. Akbar, the defender of the faith, is that king whose brow, in its loftiness, passes over the heaven.

2. In the time of such a sovereign, who is obeyed by wild beasts and birds,

3. It occurred to this Habash Khán to build a mosque for the sake of a benefit.

4. The chronogram of this high mosque was found in counting up the letters in *Bug'ah i Khair*, 'a religious building'.

This gives 987 H., or A. D. 1579. The lower margin, however, gives the words—'In the month of Rajab, 986', i. e., September, 1578. The margin on the top contains the creed, and the right and left margins the Korán verse, 'A help from God, and a near victory, and give the glad tidings to the faithful'.

II.

From the inner entrance to the Palace of Rohās. The letters are in beautiful *Nasta'liq*, and numerous arabesques and flowers are between the lines and the letters. The Persian inscription measures 6 ft. 1 in. by 1 ft. 10 in.; and the Sanskrit inscription on the left of it, 2 ft. 4 in. by 1 ft. 10 in. Bābu Rājendralāla Mitra has promised to furnish a reading and translation of the latter. The metre of the chronogram is *Musāra'*.

این تاریخ در زمان سلطان جلال الدین محمد اکبر بادشاه غازی خلد الله ملکه
وسلطانه

دروازه مقیم بنای چو شد تمام • دروازه سپهر زرشکش سقیم شد
ساله عمارتش چونودم بطبع گفت • از راجه مانسنگه بنائی مقیم شد
تحریر فی التاريخ بیست و هفتم ۲۷ شهر رجب المرجب سنه هزار و پنچ الفی •
پروغت سریده هر
داروغه بل بهدر
زناردار صنعت گر
اوسناد مبارک

This chronogram (was written) in the time of Sultan Jalāl uddīn Muḥammad Akbar Bādshāh i Ghāzī,—may God perpetuate his kingdom and his rule!

1. When the firm gate of the edifice was completed, the gate of heaven ailed from envy.

2. When the date of its erection appeared to Genius, he said, 'Rājāh Mān Singh has erected a firm building.'

Written on the 27th of the honored month of Rajab, 1006, of the Alfī Era.

The family priest (*purohit*) [was] Śrī Dhar; the Dāroghah, Balbhadr the Brāhman; the architect (*ṣan'atgar*), Ustād Mubārak.

This is the first inscription that I have seen, in which the year is expressed in *Alfī* years—an invention of the emperor Akbar. As the 'restorer of the millennium' and founder of a new faith, he declared that Islām had done its work, and ordered a history of the first millennium to be written, in which the years were counted from the death of the Prophet, instead of from the flight (*hijrah*) to Madīnah. The death of the Prophet was euphemistically designated '*rihlat*', 'departure'; but a manifest slur cast on Islām lay in the statement that Islām commenced with the death of the Prophet, as if his whole life belonged to what Muhammadan historians style the *jāhiliyyat*, or 'time of ignorance', i. e. the pre-islamitic period of Muhammadan history; *vide* Kin Translation I, p. 185; and Prof. Dowson, in Elliot's History, V, on the *Tārīkh i Alfī*.

The chronogram of the inscription is ambiguous, on account of the *kamsak* in بنائی; but as the date has also been expressed in numerals, it is

clear that the poet has taken it for half a *yd*, i. e., for $\frac{1}{2}$ of 10, which is rather unusual. The words, without the hamzah, give 1000.

As the *Alfi* reckoning differs from the Hijrah era by ten years and two months, the inscription belongs to the end of 1015 H, or the end of the first year of Jahāngir's reign. And yet Akbar is mentioned as the reigning monarch! We have thus mural evidence of the dissatisfaction which Mān-singh felt at Jahāngir's succession.

III.

The following Persian inscription conveys the same information as the preceding, but the date is expressed in Hijrah years. The reading is incomplete, as many of the letters appear to be broken.

تاریخ گفتا * شنیده آن سوار خنگ
 یاجوج کوه روند * سده سکندری شده از راجه مانسنگه
 سقداری پروغت سریدهر و گویال داس چوهان و بعده اهنم بهاتیه [؟] خان
 بنی اسرائیل و داروغه بل بهدر نادا و صنعت گرانستاد مبارک تحریر فی التاریخ غره
 شهر ذی القعدة سنه عشر و خمس و الف ۱۱

The 1st Zī Qa'dah, 1015 corresponds to 20th February, 1607, the very end of Jahāngir's first regnal year. In this inscription, neither Akbar nor Jahāngir is mentioned. The mention of Akbar in the preceding inscription was perhaps expected to be overlooked by people; for few might be acquainted with the *Alfi* era.

IV.

From a Báoli and Dargáh at the foot of Hill Rohās. Four lines; 5 ft. 1 in. by 1 ft. The second line is ornamented with several rosettes, a duck, and a tiger. Several words in lines 3 and 4 are illegible.

در عهد شاه جهان پادشاه غازي که حکومت قلعه داري بمنصب سه هزار
 و فوجداري از مکرابن و پرگنه سوس و کتنبه تا بنارس و جاگیر پرگنه چونه و پرگنه
 منگورو و تلوتهو و اکبرپور و بلونجه و جیگر و جیلا بنواب عالي مقدار اخلاص خان
 مقرر و مسلم بود و اقل عباد الله ملک وصال که بمنزل فرزند مقرر بود
 و داروغگی قلعه رهتاس و فوجداري بجیگر نواحی قلعه مسلم بود درین اثنا
 خویش [؟] نزدیکی برحمت حق پیوست بنا بران بتوفیق حق بخاطر رسیده که
 خانه آخرت در حین .. چیتوره و مسجد و باولي و باغ طرف شمال
 و جنوب بنا کرد و شروع عمارت بتاریخ پنجم ربیع آخر سنه ۱۰۵۶ و بتاریخ رمضان
 الیہاری سنه ۱۰۵۷ هجری مرتب شد ۱۱

[It was] in the reign of Sháhjahán Pádisháh i Ghází, that the excellent Nawáb Ikhláç Khán held the command of the fort with a mançab of 3000 horse and the faujdárí of the region from Makráín and Parganah Siris and Kutumbah as far as Banáras, and the jágír tenure of Parganah Chaund and Parganah Mañgor and Tilothú and Akbarpúr and Bilonjah and Bijaigar and Japlá, and that the meanest of God's slaves Malik Wiçál, who was honored with the rank of a son, was the Dároghah of Fort Rohtás and Faujdár of Bijaigar in the neighbourhood of the Fort. In the course of time, a near relation died. Hence by God's grace it occurred to him [Malik Wiçál] that the house of the life to come at the time of.....and he built a *chabútrah* and a mosque....a well and a garden towards the north and the south. And the beginning of the building [was made] on the 5th Rabí II, 1056, and it was ready in Ramazán, 1057 [October, 1647].

Parganahs Siris and Kutumbah border on the right bank of the Son; Tilothú is a small town on the left bank of the Son, N. E. of Rohtásgarh. Parganahs Bilonjah and Japlá touch the right bank of the Son, and are separated from each other by the Koil River, which flows into the Son, S. of Rohtás. Mañgor lies on the Karamnása, Long. 83° 17', Lat. 25° 3' (*vide* Beames, Elliot's Races of the N. W. P., II, 119), and adjacent to it, to the East, lies Parganah Chaund. Bijaigarh lies W. of Rohtás. Akbarpúr and Makráín are the names of two adjacent parganahs in Máldah and extend along the Ganges opposite to Bájmahall; but I do not know whether they are meant.

Regarding the commandant of Rohtás, Nawáb Ikhláç Khán, I find two Amírs of that title mentioned in the Pádisháhnámah. One Ikhláç Khán was a son of Báyzid Beg, and was in 1042 appointed to Rohtás. He rose to a command of 2000 horse, and died about 1050 H., in the 13th year of Sháhjahán's reign. He appears to be the Ikhláç Khán who is mentioned in the inscription. The second Ikhláç Khán was a grandson of Qutbuddín, Jahángír's foster-brother (*Áin Translation*, I, 497); his name was Shaikh Ilahdiyah. I do not find Malik Wiçál, the builder of the mosque, mentioned in the histories.

Sahasrám, South Bihár.

From a loose slab, found by General Cunningham at the foot of the Chandan Pír Hill, Sahasrám. The name of the saint after whom the hill is called, does not occur in the biographical works on Muhammadan saints. *Vide* Buchanan.

بدور شاه نور الدین جهانگیر • زمان خان سرور صفدر القاب
علی اکبر چہ و مسجد بنا کرد • کہ تائب تشنگان گردند سیداب
چون از بعضی طلب کردم خرد گفت • ز بہر طاعت رزاق و وہاب

1. During the reign of Sháh Núr-uddín Jahángír, at the time of Khán Sarwar, entitled *Çafdar* [Khán],

2. 'Alí Akbar built a well and a mosque, so that the thirsty might become satisfied.

3. When I searched for a chronogram, genius said, '[It was built] from obedience to God, the nourisher and giver.' A. H. 1022 [A. D. 1613].

The following inscription is quite modern, and records that Fakír Muhammad Chaudharí, tobacco-seller, of the tribe of the sellers of vegetables, in 1211 Fasli, or 1218 H., [A. D. 1803], built or renovated the Dargáh of Chandan Pír.

بسم الله الرحمن الرحيم الله المستعان على ما تصفون بتاريخ پانزدهم شهر
شوال سنه ۱۲۱۸ هجري مطابق دوم ماه كاك كاك سنه ۱۲۱۱ فسلې [سقف؟]
مسجد دالان . . . درگاه حضرت چندن شاه قدس الله سوه العزيز فقير محمد
چودھري تماكو فروش قوم سبزي فروش تيار ساخت ||

The following papers were read —

1. *On the Angami Nágas and their Language.*—By Capt. J. BUTLER, B. S. C., *Political Agent, Nágá Hills.*

Capt. Butler's essay consists of an Introduction and four Chapters. Chapter I is historical and geographical; Chapter II treats of the government, the manners and customs, and the agriculture of the Angami Nágas; Chapter III gives an outline of the Geology and Natural History of the country; and Chapter IV contains a valuable outline of Angami Grammar, and a very complete vocabulary.

Eight plates of vivid sketches by Lt. Woodthorpe, R. E., accompany the paper.

The essay will appear in No. IV of Pt. I of the Journal, for 1875.

COLONEL THUILLIER said with reference to Capt. Butler's interesting and instructive paper which had just been read, he regretted having to inform the meeting that he had received information from Lieut. Woodthorpe, R. E., who was now with Capt. Butler, Political Agent, prosecuting the exploration of the whole of the Nágá country south of the Brahmaputra, subtending the district of Sibaágar from Jaipur to Sámagúting and south-west of the villages in the vicinity of Jaipur, laid down last season, that whilst the Survey Party were cautiously proceeding through a new track, not more than 20 miles from Golághát, they were suddenly attacked on Christmas-day by Nágas between the villages of Lakhuti and Pángti—where they were concealed in ambush in the high grass jungle, and not discernible even a few yards distant, when Capt. Butler received in his right breast a spear-wound of a severe character.

This disaster compelled the survey party to halt for some time to afford assistance to the wounded officer and to allow the military guard

under Lieut.-Col. Tulloch to come up and chastise the village of Pángti, which was effectually done on the following morning, the whole party remaining encamped there afterwards.

The precise cause for such an attack so near Golághát, is not yet known, but it would seem to indicate that the Nágás of the village of Nínú were not sufficiently punished for the terrible massacre committed there last season on Lt. Holcombe's party, or else that it is impossible to make these savages, inhabiting closely approximate villages, comprehend or realize the lessons which take place so close to them, so hostile are they even amongst themselves, one village with another in close proximity.

He expressed a strong hope that the services of that intrepid explorer and excellent officer, Capt. Butler, might not long be lost to the Government. It would be almost a national calamity, if such a valuable officer lost his life under such circumstances.

Capt. Butler was very ably supported by Lt. Woodthorpe, who had now obtained considerable experience amongst these hill-tribes, and it was to be hoped that this temporary disaster might not have the effect of preventing the present good policy of the Government of India from being carried out, until we had a thorough knowledge of the whole geographical situation round the British border of Asám, which has so long baffled all attempts at its investigation, but has now been declared so essentially necessary for all administrative purposes of that Province.

The completion of our geographical knowledge of the tracts held by these hill-tribes between the British territory of Asám and Burmah, is absolutely essential to the depiction of the entire line of the British Eastern Frontier.*

2. *On the influence of Eosin on the Photographic Action of the Solar Spectrum upon the Bromide and Bromiodide of Silver.*—By Capt. J. WATERHOUSE, Asst. Surveyor General of India.

At the November meeting of the Society I exhibited some plates showing the action of the red rays of the spectrum on dry films of collodio-bromide of silver stained with a blue dye. I have since received from Berlin a sample of a new red dye called Eosin, and have obtained results on dry bromide plates stained with it, which are of particular interest from the fact that the photographic action of the spectrum on such plates is entirely different to its ordinary action on an unstained plate, *i. e.*, instead of the maximum of action being in the indigo and violet it is in the green and yellow, as will be seen in the accompanying photographs and in fig. 5 of Plate I.

* Since the meeting took place, the sad news of Capt. Butler's death on the 7th January has been received, and the Government Gazette of the 22nd instant contains a handsome tribute to his character and worth.

This effect is quite in accord with Dr. Vogel's theory, that the sensibility of dry collodio-bromide of silver films for any particular part of the spectrum may be heightened by staining them with a suitable dye which absorbs that part but not others; but so distinct a change of position of the maximum of action from the indigo to the green has not, so far as I am aware, been observed before on films of bromide of silver, though Dr. Vogel has noticed it on films of chloride of silver stained with roseine. [Ber. Deut. Chem. Ges. 1874, p. 546.]

The dye to which the name of *Eosin* has been given, from *Eos*, the red of the morning dawn, is, according to Hofmann,* the phtalein of dibromresorcin, or tetrabromofluorescin, and is soluble both in water and alcohol, the solution being of a bright rosy-orange colour with a strong greenish-yellow fluorescence, tending to green in the watery solution and to yellow in the alcoholic. Examined with the spectroscope, a weak watery solution shows a strong obscuration of the spectrum from below E to above F, with a strongly marked absorption band about E and *b*, and a second fainter band about and above F [Plate I, Fig. 2]. A weak alcoholic solution shows similar bands, but displaced more towards the red, the wide band beginning at *b* and extending to about one-third the distance between E and D, while the fainter band is below F (Fig. 3).

Dr. Vogel has laid it down as one of the conditions of success in such observations, that the dye employed shall combine chemically with free iodine or bromine, and I was led to specially select this dye for experiment from an anticipation that it might prove particularly suitable for the purpose on account of its being a compound of resorcin, a substance which readily combines with bromine and particularly with iodine.

The dry bromide plates experimented on were prepared in two ways—

1st.—By using bromised collodion coloured with the dye. This collodion showed no fluorescence and was of a bright golden colour inclining to orange, without any trace of the beautiful rosy tint peculiar to the dye. This, however, was probably caused by acidity of the collodion, induced by long keeping, as a more neutral and fresher sample shows a fine yellow fluorescence and rosy tint. Examined in the spectroscope the absorption bands were absent, or so faint as not to be distinguishable, an effect which is observed with an acid watery solution of the dye. The films given by this collodion were rather transparent and showed only a slight yellowish opalescence by direct transmitted light, but by reflected light, or laid on white paper they showed a distinct pink tint. Examined in the spectroscope, the peculiar absorption bands in the green were not perceptible.

2nd.—By applying a watery solution of the dye to plates prepared with unstained bromised collodion after the free nitrate of silver had been removed

* Ber. Deut. Chem. Ges. VIII. 62, 146, quoted in Am. Jour. Arts, Sc. May, 1876.

by thorough washing. These films were denser than the first and showed a deep orange colouration by transmitted and a strong pink by reflected light. Examined with the spectroscope no absorption bands were visible, and the spectrum was quite obscured above F.

As already stated, the absorption spectrum of the dye shows well marked bands in the green, and according to Dr. Vogel's theory, this part of the spectrum should act with increased intensity on the dry bromide plates stained with the dye; though the action on the plate may be expected to be nearer the red than the absorption band of the colour, in accordance with Kundt's law that when non-absorbent media are mixed with an absorbent substance, the absorption band has no constant position, but is displaced towards the red, in proportion as the dispersion of the added non-absorbent medium increases.

Dry plates prepared with the coloured bromised collodion and exposed for periods varying from 1 to 5 minutes, to the spectrum given by a miniature direct-vision spectroscope of about six inches focus, exhibit after development a much greater sensibility to the green rays than to the blue, indigo, or violet, the maximum of action being below E, extending to about half way to D, and then decreasing till all action ceases just about D. Above E the action gradually lessens nearly to F, beyond which is a wide band of decreased action extending more than half way to G, followed by faint but increased action extending for some distance beyond H into the ultra-violet. The increased action in the yellow and green is strongly marked by its contrast with the very weak action in the blue, indigo and violet.

On the dry plates prepared by immersion in a watery solution of the dye, the same general characteristics are observed, but the image is stronger and the band of maximum action somewhat more extended between E and D, towards D, at which point the action ends almost abruptly (Fig. 5). The band of decreased action in the blue just above F and extending about half way to G is very clearly marked. The same decreased action accompanying increased sensitiveness for less refrangible rays, has been observed on plates stained with various dyes, but the cause has not yet been explained and further observation is required to elucidate the law regulating its occurrence.

It is worthy of note that traces of action in the green and yellow were distinctly visible on the plate before development, though nothing could be seen in the indigo and violet, as is usually the case. This is the only instance in which I have observed this effect, though several colours tried have given increased sensibility for the less refrangible rays.

A reference to the diagrams in Plate I will show that these results are quite in accordance with Dr. Vogel's theory, and tend strongly to confirm it. As, however, Dr. Vogel has stated his rule in general terms as applica-

ble to *any* colour,* experiments must be tried with various dyes, before a conclusive decision can be come to. The results of such an examination I hope to lay before the Society on a future occasion.

A further peculiarity of this dye is that ordinary wet collodion plates prepared with bromo-iodised collodion containing it, exhibit a marked prolongation of the photographic action of the spectrum in the green and yellow, extending it beyond its usual limit of *b*, or at most *E*, nearly to *D*. The stained bromo-iodised collodion is strongly fluorescent and retains its rosy tinge. Examined with the spectroscopé it shows two strong absorption bands in the green. (Fig. 6.)

The character of the photographic image of the spectrum, as obtained on the stained wet bromo-iodide plates, is entirely different from what it was in the dry bromide plates, and we have an image of fair density showing strong action extending from above *H*, to a little below *G*, where there is an abrupt and distinctly marked band of lessened action extending to about half way between *F* and *E*, from which point the action decreases to its minimum between *b* and *E*, and again rises at *E* with a marked increase of action extending half way to *D*, whence it gradually decreases till it disappears about *D*. (Fig. 7.) The increase in the extent of the photographic action towards *D* will be seen by comparing Figs. 7 and 8, the latter of which shows the spectrum as taken upon an unstained wet bromo-iodide plate.

It is noticeable that a band of decreased action is observed almost corresponding with the position of the space between the absorption bands of the dye, and further investigation may possibly show similar effects with other dyes.

From this marked sensibility to the green and yellow rays of the spectrum, it might have been anticipated that wet plates prepared with the eosin-stained collodion would have shown an increased sensitiveness for foliage and other coloured objects of a green or yellow tint, and might have proved of use in photographing coloured maps, paintings or other documents such as the Sanskrit MSS. written on yellow paper. On trying a landscape I found that the dye lessened the sensitiveness of the plate very considerably, and that the exposure had to be increased to about three times what was necessary for similar plates unstained. Even with this increase of exposure, there was little or no improvement in the detail of the foliage, but the image was much denser than usual and the shadows were particularly clean and well defined. I also tried photographing bouquets of flowers and a stained glass window comprising red, green, yellow and blue, both with dry bromide and wet bromoiodide plates, but found that little practical advantage was to

* See paper in Pogg. Annal. Vol. C1. p. 452, translated in Phil. Mag. S. 4, Vol. 47, p. 272.

be gained by the use of the stained collodion, though the plates did show some slight increase of sensitiveness for yellow. Further trials in copying letterpress on yellow, green and red papers have given similar results, and the only well-marked advantage of the stained plates for such work is the great increase of density combined with clearness of the shadows, which might be turned to useful account in cases where the increased length of exposure is of no consequence.

From these results it will be evident that the photographic action of the spectrum is but a very slight index to the action of coloured objects, and that methods have yet to be found which will enable us to overcome many of the difficulties of colour still connected with the practice of photography. The observations, however, have their value in showing that the photographic action of the spectrum is more extended than has usually been stated and further investigation may lead to some useful practical application of the principle of staining the collodion film.

LIBRARY.

NOTE.—It is proposed to adopt an entirely new and improved arrangement of the Library List, commencing with the present volume of the Proceedings, but owing to delay in carrying out the new arrangement for the list of additions received in December, it could not be included in the present number of the Proceedings. The February number will therefore contain the additions to the Library during December and January.—J. W.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR FEBRUARY, 1876.

The Annual Meeting of the Society was held on Wednesday, the 2nd February, 1876, at 9 o'clock P. M.

T. Oldham, Esq., LL. D., President, in the chair.

According to the bye-laws of the Society, the President ordered the voting papers to be distributed for the election of Officers and Members of Council for 1876, and appointed Messrs. Pedler and Peterson, Scrutineers.

The President then called upon the Secretary to read the Annual Report.

ANNUAL REPORT FOR 1875.

In presenting their Annual Report for 1875, the Council have once more the satisfaction of congratulating the Members on the continued prosperity of the Society, as evinced by the increase in its funds, though the number of new members again shows a falling off.

The number of members elected during the year under review, has been 28, against 85 of the previous year.

During the year 1875, the Society sustained the loss of 25 ordinary members by withdrawal, 1 by removal and 3 by death, in all 29. The total number of ordinary Members was 346 at the end of the year 1874 and 345 at the close of 1875.

Of these 345 members, 65 are absent from India, of whom 50 are non-subscribing members, leaving a balance of 295 paying members, 118 of whom are Resident and 182 non-Resident Members.

The table below shows the fluctuation of members during the last ten years.

Year.	Paying.			Absent.	Total.
		Resident.	Non-Resident.	Non-Paying.	
1866,	293	124	169	94	887
1867,	307	154	153	109	416
1868,	294	159	185	133	427
1869,	304	162	142	138	442
1870,	266	184	132	148	414
1871,	286	112	174	160	446
1872,	279	105	172 + 2 L. M.	159	438
1873,	305	116	186 + 3 L. M.	53	358
1874,	312	127	184 + 3 L. M.	82	346
1875,	295	113	179 + 3 L. M.	50	345

Two Honorary Members were elected during the year. *viz.* : Prof. J. O. Westwood, of Oxford, and Dr. O. Böhtlingk, of Jena ; also two Associate Members, *viz.* :—Rev. J. D. Bate, Allahabad, and Maulavi 'Abdul Hai, Calcutta.

Among those whose loss by death the Society have to regret, the Council have to record, of the ordinary members, the names of Lieut.-Col. T. C. Hamilton, Rangoon, J. H. Haworth, Esq., Calcutta, and Lieut. W. A. Holcombe, Assam, who was treacherously murdered by the Nágás, while on duty with the survey party in the Nágá Hills. Of the Honorary Members, Dr. Ewald, and the Right Hon'ble Sir E. Ryan, Kt. ; an Associate Member, Sayyid Karámát 'Ali, and Dr. Wilson, of Bombay, Corresponding Member. The name of Munshi Niwal Kishwar has been removed from the list on account of non-payment of his subscriptions.

Among the contributors to the pages of the Journal, the Council regret to announce the death of Mr. Thomas W. Beal of Agra. He was for a long time employed as a clerk in the Sudder Board of Revenue at Allahábád and later at Agra. In 1849, he published at Agra his *Mifidh-utta-wairikh*, which is dedicated to Sir H. M. Elliot. A second edition (406 pages, folio) was lithographed at Lakhnau in 1867. The book is a charming collection of biographies of illustrious Moslems and Indian celebrities, and of choice chronograms, many of which were composed by the author himself. It contains, besides, numerous copies of Muhammadan inscriptions taken by the writer in his journeys in Upper India. The book is written in easy and elegant Persian, and shows that the author had a

profound knowledge of the MSS. sources of Indian history and the treasures of Persian poetry.

Mr. Beal for several years forwarded to the Society readings of Muhammadan inscriptions from the neighbourhood of Agra, which were published in the Proceedings of the Society for 1873, 1874, and 1875, and also allowed the Society to take copies of several rare and unique historical MSS. He had just been proposed for election as an Associate Member, when he died at Agra, on 9th June, 1875, at the advanced age of eighty-one years.

Though not members of the Society at the time of their death, the names of Col. S. R. Tickell, and Capt. T. Hutton, both of whom were formerly valued contributors to the Society's Journal, may be recorded among those of others who have passed away during the year. Col. Tickell was elected in November 1859, and remained a member of the Society till January 1865. During this period he contributed several valuable papers, chiefly on Indian ornithology and ethnology, among which may be mentioned "List of Birds collected in the jungles of Borabhum and Dholbhum;"—"on the Oology of India, a description of the Eggs also Nests of several Birds of the plains of India;"—"Notes on the Henma or Shendoos, a tribe inhabiting the hills north of Aracan."

Capt. Hutton appears never to have been a member of the Society, but the general Index to the early volumes of the Journal shows a list of between twenty and thirty papers from his pen on various subjects connected with Natural History and Geology.

Indian Museum.

The Council continue to carry out the provisions of Act XVII, of 1863 and transfer all Natural History and Archaeological specimens, received by them, to the Trustees of the Indian Museum.

The Trustees on the part of the Society were:—

Col. H. Hyde, R. E., Col. J. E. Gastrell, Dr. S. B. Partridge, and Dr. T. R. Lewis.

Finance.

Notwithstanding the decrease in the number of paying members, the Council are happy to report, that the Financial position of the Society continues in a satisfactory state.

The actual total receipts by subscriptions from members during the year under review amounts to Rs. 9,760, exceeding the total receipts of the previous year, which were Rs. 8,729, by Rs. 1,031.

The amount due from members on account of arrears of subscriptions has been reduced this year by Rs. 448, leaving a balance of Rs. 6,561 ~~to~~ to be collected, against Rs. 7,009 in arrears in 1874.

The Council take this opportunity of again earnestly urging upon mem-

bers, the importance of punctual payment of their subscriptions, and the early paying up of all arrears. The outstandings of the Society have for many years amounted to a large sum, and though it is satisfactory to know that the loss under this head is not increasing, it still causes a serious deficit in the finances of the Society.

The assets consisting of—

Government Securities,	Rs.	13,200	0	0
Cash in hand,		160	9	4
Balance in Bank of Bengal,		8,858	2	8

amount to Rs.... 17,218 11 7

It is satisfactory to observe that during the last year, an additional sum of Rs. 4000-0-0 has been invested in Government Securities, of which sum Rs. 1,182-0-0 is the amount collected from admission fees during 1874.

The following is a statement of the Receipts and Disbursements of the Society during the year—

RECEIPTS.

	1874.	1875.
Subscriptions,.....Rs.	8,729 8 0	9,760 15 0
Admission Fees,	1,182 0 0	980 0 0
Publications,	2,126 8 7	1,729 10 0
Library,	412 12 6	411 14 0
Secretary's Office,	23 12 9	24 15 6
Vested Funds,	449 0 0	449 0 0
Building,	4,800 0 0	4,800 0 0
Coin Fund,	0 0 0	0 0 0
Sundries,	2,861 4 2	3,657 0 1
	<hr/>	<hr/>
Rs.	20,584 9 0	21,768 6 7

Balance in the Bank of Bengal, 1874, ...	6,856 12 2
Cash in hand,	161 9 1
	<hr/>
Total, Rs.	28,781 11 10

DISBURSEMENTS.

	1874.	1875.
Publications,	Rs. 7,440 11 8	7,373 2 1
Library,	2,782 2 9	4,475 6 6
Secretary's Office,	3,119 8 10	3,769 9 9

DISBURSEMENTS,—*continued.*

	1874.			1875.		
Vested Funds,	1,046	5	5	4,073	9	8
Building,	919	13	10	1,008	12	7
Coin Fund,	266	0	0	376	4	0
Sundries,	1,228	7	7	3,686	8	8
	Rs. 17,353			24,763		
Balance in the Bank of Bengal,	8,858	2	3			
Cash in hand,	160	9	4	4,018	11	7
	Total, Rs.			28,781		

With reference to the above statement the Council would draw the attention of members to the satisfactory increase in the income of the Society.

The estimated income was put down at Rs. 16,500 for the year 1875, The receipts realised, however, were Rs. 21,763, shewing an increase of Rs. 5,263, on the estimate. On the other hand, the Expenditure during the year has exceeded the amount (Rs. 16,500) allotted in the budget estimate by Rs. 8,263; but as this sum includes Rs. 4,000 expended in the purchase of Government Securities, the excess is in reality only Rs. 4,263, which was partly incurred on account of the Library, (the sum of Rs. 1,475, being spent in excess of the Budget estimate) and the increase of Establishment expenses of the Society on the appointment of a new Assistant Secretary. Notwithstanding this excess, however, the expenditure during 1875, has been less than the receipts by Rs. 1000.

The following is the Estimate of Income and Expenditure for 1876.—

INCOME.

Subscriptions,	Rs.	9,000	0	0
Admission Fees,		900	0	0
Publications,		1,700	0	0
Library,		400	0	0
Vested Funds,		800	0	0
Building,		4,800	0	0
Sundries,		3,000	0	0
	Rs.	20,400	0	0

EXPENDITURE.

Publications,	Rs.	8,000	0	0
Secretary's Office, Librarian, &c.,		5,500	0	0
Building repairs,		500	0	0
Coin Fund,		500	0	0
Library,		2,000	0	0
Sundries,		8,000	0	0
Balance,		900	0	0
		<hr/>		
		Rs.	20,400	0 0
		<hr/>		

Library.

During 1875, the Library received an addition of 927 volumes, or parts of volumes. Of these, 44 have been presented by Government, 89 presented by authors, 289 purchased and 555 by exchange with other Societies.

The Photographic Collection of the Society has received several valuable additions during the course of the year, among which may be noted a set of splendid photographs and lithographs illustrating the ruins of Bôrô Boudour in Java, received from the Batavian Society of Arts and Sciences, and for which a special vote of thanks was given; a set of 67 photographs of the ancient Architectural remains of Chota Nagpûr presented by the Government of India, Home Department; 49 photographs of the Ancient Temples at Barwa Sagar, Barauli, in the Jhânsi district, and of Muhammadan buildings at Badâon and Kol from the Government of the N. W. P., and a set of 5 photographs of copper Sasânas from Dr. G. Bühler.

Publications.

There were issued in 1875, 10 numbers of the Proceedings, containing, together with the Meteorological Observations, upwards of 325 pages of letter-press, illustrated by 5 plates. The Journal, Part I, of which 4 Nos. have been published, consists of 404 pages of letter-press, illustrated by 26 plates. Of Part II, 3 Nos. have also been published, containing upwards of 200 pages of letter-press, illustrated by 10 well executed plates. An extra number of Part II, in 167 pages, containing a Catalogue of Mammals and Birds of Burmah by the late Mr. E. Blyth, with a Memoir and Portrait of the author, and an introductory preface by Mr. A. Grote, has just been printed in England, under the general editorship of Mr. Grote, to whom the Society is greatly indebted for the care and attention he has bestowed upon the work. The special thanks of the Society are also due to Lord Walden, for the large amount of time and labour he has devoted to the Catalogue of Birds which, by the valuable and copious note and additions he has made to it, has become a complete list of the Burmese species, as ascertained to date; as also to Dr. J. Anderson, and Dr. Dobson, who have materially

assisted in perfecting the work, the former by revising the Catalogue of *Mammalia*, the latter by editing the Catalogue of the *Chiroptera*.

Coin Cabinet.

The additions to the Society's Coin Cabinet, made during 1875, consist of 32 silver, and 2 copper coins. Of these 25 silver and 2 copper coins were presented to the Society by Col. Stubbs, (17 silver, 1 copper); Mr. E. V. Westmacott, C. S., (4 rare silver coins struck by Mahmúd Sháh I. of Bengal); Capt. Williamson, Gáro Hills, (one unique silver Nara Náráyan of Kúch Bihár, and one Bengal Dáúd Sháhí); Bábu Mohini Mohun Rái, (2 Bengal Nuçrat Sháhí); and Mr. S. Kurz (one copper Lapeck). These coins were exhibited at the meetings held in March, June, and November, and several of them have since been published in the Journal.

Seven rare Bengal silver coins were purchased (Proceedings, June, 1875, p. 118).

Stoliczka Memorial.

The Council are happy to report that the subscriptions to the Stoliczka Memorial Fund amount to Rs. 2,872, of which Rs. 2,680 have already been realised, besides £76 collected in England by the London Committee. As the amount subscribed was sufficient to cover the cost, the Committee have considered it desirable to obtain both a portrait and a bust of their late esteemed Natural History Secretary and have solicited the co-operation of the London Committee in giving effect to this proposal. The London Committee have accordingly made arrangements with Mr. Dickinson of Langham Place for the painting of a kitcat portrait at a cost of 100 guineas, and they have commissioned Mr. Geflowski, a rising sculptor, to execute a bust, also at a cost of 100 guineas. It is expected that the model of the latter will be completed in March.

The Council would take this opportunity of thanking Mr. Grote, Dr. Day, and other members of the London Committee for the valuable co-operation and assistance they have rendered in furthering the objects of the Fund by the collection of subscriptions, the selection of artists, and the supervision of the work.

Zoological Garden.

From time to time during many years past the question of the establishment of a Zoological Garden in Calcutta has received the attention of the Society, but from various causes nothing could ever be done towards carrying out a project of which the great desirability and importance have always been fully recognised by the Council. It is, therefore, most gratifying to record that His Honor the Lieutenant-Governor of Bengal has taken the matter in hand, and has assigned a large plot of ground at

Alipore which has been cleared and planted as a site for the Garden. Several animals have already been transferred from the collections of Mr. Schwendler and others, and upwards of Rs. 200,000 have already been collected in subscriptions towards the establishment of the Garden. The Council therefore hope that its ultimate success may now be looked upon as secured,

Officers.

The Philological and Natural History Secretaries, Messrs. Blochmann and Wood-Mason, have retained charge throughout the year, of their respective parts of the Journal, and other duties of their Secretaryships. Capt. Waterhouse has continued to act as General Secretary during the year, with the exception of the months of March and April, when Dr. Lewis undertook the duties of General Secretary in Capt. Waterhouse's absence. The office of Financial Secretary and Treasurer was held by Col. J. E. Gastrell until the month of May, when Capt. Waterhouse took temporary charge during Col. Gastrell's absence.

Bábu Pratápachandra Ghosha, late Assistant Secretary, having resigned his appointment at the end of April last, Mr. G. S. Leonard was appointed Assistant Secretary in his place; and though the change involves some additional expense, the Council have every reason to believe that it is an improvement on the former state of things, and to be satisfied with the zeal and attention to his duties shewn by Mr. Leonard, who has commenced the preparation of an Index to vols. 24 to 43 of the Journal, and has also given attention to the preparation of the new catalogue of the Society's Library, though the progress of this most important work is greatly hindered by the crowded state of the rooms now occupied by the Society. It is, however, to be hoped that this cause of delay will soon disappear. Bábu Gopál Chunder Dutt, who was engaged in 1874 as an assistant in the Secretary's office, resigned his appointment at the same time as the late Assistant Secretary, and no other appointment has been made in his room.

Munilall Bysak, Assistant Librarian; Jado Bindo Bysak, Storekeeper; and Bábu Baddinath Bysak, have continued to do good service in their respective branches.

Bibliotheca Indica.

Arabic and Persian Series.

Maulawí 'Azíz urrahmán, of the Presidency College, Calcutta, has brought the edition of the *Farhang-i-Rashídí* to a close. This Persian Dictionary contains 708 pages quarto, in two volumes. The work was compiled towards the end of Sháhjahán's reign, in 1064 H., by Sayyid 'Abdurrahmíd of Tattah, in Sindh, one of the best grammarians and lexicographers that India has produced. During the 17th and 18th century of our era, the study of Persian was zealously cultivated in India by both Muhammadans and Hin-

dās, and numerous critical works on Persian lexicography, grammar, and idiom, were written. Among them, the *Farhang i Rashidī* holds a prominent place. The numerous Persian dictionaries which had before been compiled and had more or less been eclipsed by Jamāl uddīn Injū's *Farhang i Jahāngirī*, were now for the first time critically examined: Sayyid 'Abdurrahīm discovered in the older dictionaries a large number of words that never existed in the language and had found their way into the dictionaries through bad MSS. and careless copyists. Again, words had been entered into the older dictionaries with wrong meanings, because the passages in which they occurred had been wrongly explained. These and other defects were corrected by Sayyid 'Abdurrahīm. His work forms thus the basis of Persian lexicography, and has been used as such by later writers, such as Arzū, Wāris, and Tek Chand. The Society's edition of the *Farhang* will therefore be of the greatest use to European scholars. Maulawī Zulfaqār 'Alī and 'Azīz urrahmán, the editors, have not only carefully collated the several MSS. which the Society had placed at their disposal, but they have also added valuable notes from Surūrī, Jahāngirī, and the Sirāj. The numerous quotations from Persian poets have in all cases been compared with those in the *Jahāngirī* (where they are generally quoted at full length), and the editors have seen that they are given metrically correct.

Of the Arabic biographical work, entitled 'the *Iqābah*', no fasciculus was issued during last year; but Nawāb Muhammad Qiddīq Hasan Khān, Prime-Minister of Bhopāl, has offered to the Society the loan of a complete copy of this rare work. On the receipt of the MS., the work will again be continued by Maulawī 'Abdul Hai, of the Calcutta Madrasah.

Major Raverty has issued two more fasciculi (Nos. V and VI,) of his annotated English translation of the *Ṭabaqāt i Nāqirī*, which brings the work down to the reigns of the first Muhammadan kings and governors of Bengal.

Of the *Akbarnāmah*, Maulawī 'Abdurrahīm, of the Calcutta Madrasah, has issued two quarto fasciculi (Nos. III and IV), and has thus nearly completed the portion which is often called the first volume of the *Akbarnāmah*. The work in consequence of an unfavourable notice of it in the *History of India* by Elphinstone, had hitherto been looked upon by European historians as a mere panegyric of the emperor Akbar, and therefore of little historical value. Native historians, on the other hand, have always considered it as a truthful account of the events of Akbar's reign and as a model of historical style. This correcter estimate of Abul Fazl's work has also lately been adopted by Professor Dowson in his notes on the *Akbarnāmah* (Elliot's *History of India*, Vol. VI).

Sanskrit Series.

Of the Sanskrit series fourteen fasciculi have been published during the year under report. These comprise portions of seven different works. The only work completed is a translation of the *Sāhitya Darpaṇa*, a treatise on rhetoric which is held in high esteem by the Paṇḍits of Bengal, and comprises a very full summary of all the leading works on the subject. It was originally undertaken by the late Dr. Ballantyne, and about one hundred and sixty pages were passed through the press by him. On his retirement to Europe the work was left in abeyance for some time. The Council has every reason to be satisfied with the manner in which the present editor, Bābu Pramadādāsa Mitra, has completed the work.

Reference was made in the last report to the materials collected by Bābu Rājendralāla Mitra for an edition of the *Aitareya Brāhmaṇa* of the Rig Veda. The work has since been sent to press, and two fasciculi have already been published. The Bābu has also published two more fasciculi of his edition of the *Agni Purāṇa*, which, it is expected, will be completed in course of the current year.

The necessity of printing the text of the *Sāma Veda Sañhitā* with all the prosodial and musical notes which occur in the different *gānas*, entails much tedious labour, both on the editor and the printer, and having due regard to accuracy of printing, the work cannot be pushed on as rapidly as could be wished, but the progress hitherto made has been steady and satisfactory. Four fasciculi were issued during the past year, and altogether one half of the work has been completed.

Among the many commentaries extant on Śaṅkara's exposition of the Vedānta Aphorisms of Vyāsa, the *Bhāmati* of Vāchaspati Miśra is held in great esteem by Indian scholars, and an edition of this work has been undertaken by Paṇḍit Bāla Śāstrī, Professor of Hindu Law at the Benares College, and the first fasciculus, comprising about one-fifth of the work, has lately been printed. The materials available for the work are ample, and under the able superintendence of the learned professor, they will be, the Council expect, most satisfactorily utilised.

Professor Eggeling's edition of the old Sanskrit Grammar, the *Kātantra*, the publication of the first two fasciculi of which was referred to in the last report, has advanced by two more fasciculi. It is expected the work will be completed in course of the current year.

MSS. of the first part Hemadri's digest of Hindu civil and canonical law not being at the time accessible, the Council sanctioned the publication of the second part, and on the completion of it the editor, Professor Bhara-tachandra Śiromani has been engaged in carrying the third part through the press, and three fasciculi of it have already been issued.

The following is a detailed list of the works published in 1875—

Persian Series.

THE FARHANG-I-RASHÍDÍ, by MULLÁ 'ABDUR RASHÍD OF TATTAR. Edited and annotated by Maulawí 'AZÍZ-URRAHMÁN, Presidency College. Nos. 817, 818, Fasc. XIII, XIV.

THE AKBAERNÁMAH, by ABUL FAZL I MUBÁRAK I 'ALLÁMÍ. Edited by Maulawí 'ABDUR RAHÍM, Calcutta Madrasah. Nos. 819, 820, Vol. I, Fasc. III, IV.

THE TABAQÁT I NÁSIRÍ OF MINHÁJ I SIRÁJ. Translated from the Persian by Major H. G. RAVERTY. Nos. 810, 811, Fasc. V, VI.

Sanskrit Series.

THE AGNI PURÁNA, a system of Hindu Mythology and Tradition. Edited by Bábú RÁJENDRALÁLA MITRA. Nos. 813, 816, Fasc. VII, VIII.

THE MIMÁMSÁ DARSANA, with the commentary of SAVARA SWÁMÍN. Edited by Paṇḍita MAHESÁCHANDRA NYÁYARATNA. Nos. 209, 240, 315, Fasc. X, XI, XII.

THE SÁMA VEDA SAṆHITÁ, with the commentary of SÁYANA ACHÁRYA. Edited by Paṇḍita SÁTYAVRATA SAMASRAMIN. Nos. 821, 822, 823, 824, Fasc. II to V, Vol. II.

THE CHATURVARGA CHINTÁMAṆÍ by HEMÁDEI. Edited by Paṇḍita BHARATACHANDRA SÍROMAṆÍ. Nos. 826, 827, Vol. II, Fasc. I, II.

THE KÁTANTRA, with the commentary of DURGASIṆHA. Edited, with Notes and Indexes, by JULIUS EGGELING. Nos. 308, 309, Fasc. III, IV.

THE SÁHITYA DARPAṆA or MIRROR OF COMPOSITION, translated into English by Bábú PRAMADÁDÁSA MITRA. No. 330, Fasc. IV.

THE ÁITAREYA KRANYAKA OF THE RIG VEDA, with the commentary of SÁYANA ACHÁRYA. Edited by Bábú RÁJENDRALÁLA MITRA. Nos. 825, 829, Fasc. I, II.

THE BHÁMATI, a Gloss on Sankara Acharya's commentary on the Brahmasūtras, by VÁCHASPATI MÍŚRA. Edited by Paṇḍita BÁLA SÁSTRÍ, Professor of Hindu Law, Banáras College. No. 328, Fasc. I.

List of Societies, Institutions, &c., with which Exchanges of Publications have been made during 1875.

Batavia :—Batavian Society of Arts and Sciences.

Belgium :—Geological Society of Belgium.

Berlin :—Royal Academy of Arts and Sciences.

Birmingham :—Institution of Mechanical Engineers.

Bombay :—Royal Asiatic Society.

——— :—Editor, Indian Antiquary.

Boston :—Natural History Society.

Bordeaux :—Bordeaux Academy.

- Buenos Ayres** :—Public Museum.
Brussels :—Royal Academy of Sciences.
Cherbourg :—National Society of Natural Sciences.
Calcutta :—Agricultural and Horticultural Society of India.
 ——— :—Geological Survey of India.
Christiania :—University.
Copenhagen :—Royal Society of Northern Antiquaries.
Cambridge :—University.
Dacca :—Editor, Bengal Times.
Dehra Dún :—Great Trigonometrical Survey.
Dublin :—Royal Irish Academy.
 ——— :—Natural History Society.
Edinburgh :—Royal Society.
Geneva :—Physical and Natural History Society.
Königsberg :—Physical and Economical Institution.
Lahore :—Agricultural Society of the Panjáb.
Leipzig :—German Oriental Society.
Liège :—Royal Society of Sciences.
Leyden :—Royal Herbarium.
Liverpool :—Literary and Philosophical Society.
London :—Royal Society.
 ——— :—British Museum.
 ——— :—Royal Asiatic Society of Great Britain and Ireland.
 ——— :—Royal Institution.
 ——— :—London Institution of Civil Engineers.
 ——— :—Royal Geographical Society.
 ——— :—Museum of Practical Geology.
 ——— :—Zoological Society.
 ——— :—Statistical Society.
 ——— :—Geological Society.
 ——— :—Linnean Society.
 ——— :—Anthropological Institute.
 ——— :—Royal Astronomical Society.
 ——— :—Editor, Athenæum.
 ——— :—Editor, Nature.
 ——— :—Editor, Geographical Magazine.
Lyon :—Agricultural Society.
Moscow :—Society of Naturalists.
Madras :—Government Central Museum.
 ——— :—Literary Society.
Manchester :—Literary and Philosophical Society.
Munich :—Royal Academy.

- Netherlands :—Royal Society.
New Haven :—Connecticut Academy of Arts and Sciences.
Oxford :—Bodleian Library.
Paris :—Imperial Library.
—— :—Anthropological Society.
—— :—Asiatic Society.
—— :—Geographical Society.
—— :—Ethnological Society.
Pisa :—Tuscan Society of Natural Sciences.
Stettin :—Entomological Society.
Stuttgart :—Natural History Society of Württemberg.
St. Petersburg :—Imperial Library.
—— :—Imperial Academy of Sciences.
Stockholm :—Royal Academy of Sciences.
Trieste :—Adriatic Society of Natural Science.
Turin :—Academy.
Vienna :—Imperial Geological Institute.
—— :—Anthropological Society.
—— :—Zoological and Botanical Society.
—— :—Imperial Academy of Sciences.
Washington :—Smithsonian Institution.
—— :—Commissioners of the Department of Agriculture.

The PRESIDENT said—He had now to ask the meeting to receive and approve the Report of the Council for the past year. In doing so, it seemed to him that there were just one or two points to which the attention of the meeting might more particularly be called. In the first place, it was satisfactory to see that the income of the Society had shewn a considerable increase during the year. But they must at the same time not conceal the painful fact that the amount of arrears due for unrealized subscriptions, &c., was by much too large. It was not due to any want of exertion on the part of the Treasurer of the Society. The accumulation has been one of long growth, and though the amount was reduced last year, still it is far too great to be satisfactory.

Then as their funds had increased, a considerably larger sum than originally contemplated was devoted to the improvement and extension of the Library. This is, at present by far the most valuable portion of the Society's property, and though rich in many ways, it still calls for much exertion to extend and improve the collections. Progress has, he was thankful to say, been made in this direction, although nothing really satisfactory could be done until the Society had obtained more room to put out their books, and admit of their classification and arrangement, in such a way as shall render them accessible.

The Publications of the Society had maintained their character during the year. Although occasionally arrears in the issue of the parts unavoidably occur, still they had on the whole been punctually given to the public. He considered this point of punctuality and regularity of issue one of the highest importance, and that much in other ways should be sacrificed to it. Much progress had been made, however, and the Journal and Proceedings of the Society were now worthy of the high position which the Asiatic Society of Bengal had always held, as the first of non-metropolitan Societies of Science. The publications were well and sufficiently illustrated, well printed, and altogether highly creditable to the Secretaries who edited them.

Another source of much gratification was that the Council, besides incurring this additional expenditure, had been able to invest for the Society a considerable sum. He thought the importance of this could not be over-rated: the experience of every Association or Society, no matter what its object, shewed that times of depression or even difficulty will come; and that unless the Society has in itself some means of maintaining itself during these unfavourable periods, the result may be very serious. In this way the possession of a sufficient fund in vested securities, independent of such temporary changes, acts like the heavy fly-wheel of a large engine: by steadying the motion, and producing a continuity of the force, which produced that motion. He hoped this investment would be maintained until the Society had an income independent of the varying chance of subscriptions, sufficient to carry them over any such temporary difficulties as might occur.

The Philological Secretary had told them of the sound and valuable progress made in the Oriental publications of the Society, and they have been indebted to the several editors of the books for their exertions.

He would fail, however, in his duty did he not take this opportunity of saying how vastly indebted the Society were to their Honorary Secretaries and other officers. Though an officer of the Society himself, he was sorry to think that the very limited time at his disposal, from other more pressing occupations and also the state of his own health, had prevented his doing much for the Society. But this very fact enabled him to speak with greater force as to the untiring exertions of the Secretaries. At all times and on all subjects, they never ceased to work for the benefit of the Society. It would be in fact impossible for any but those who were, he might say, behind the scenes, to form an estimate of the amount of work which devolves on their officers, and of the readiness and earnestness with which it is not only undertaken, but carried through. And the Society certainly owes to their officers, the most grateful and hearty acknowledgments of their labours.

He would now put to the meeting—That the report of the Council as now read be received and approved.

The motion was carried unanimously.

The Scrutineers reported the election of Officers and Members of Council for 1876 as follows :—

T. Oldham, Esq. LL. D.	<i>President.</i>
The Hon. E. C. Bayley, C. S. I.	} <i>Vice-Presidents.</i>
Bábu Rájendralálá Mitra.	
Col. H. L. Thuillier, C. S. I.	} <i>Secretaries & Treasurer.</i>
H. Blochmann, Esq., M. A.	
Capt. J. Waterhouse.	} <i>Members of Council.</i>
J. Wood-Mason, Esq.	
Dr. T. R. Lewis.	}
Col. J. E. Gastrell.	
T. Oldham, Esq., LL. D.	}
The Hon. E. C. Bayley, C. S. I.	
Bábu Rájendralálá Mitra.	}
Col. H. L. Thuillier, R. A., C. S. I.	
Col. J. E. Gastrell.	}
L. Schwendler, Esq.	
H. Blochmann, Esq., M. A.	}
Capt. J. Waterhouse.	
J. Wood-Mason, Esq.	}
Dr. T. R. Lewis.	
J. O'Kinealy, Esq.	}
Bábu Prannath Pandit.	
Dr. W. K. Waller.	}
E. Gay, Esq.	
C. H. Tawney, Esq., M. A. .	

Messrs. Gay and Waldie were elected to audit the Annual Accounts.

The Meeting was then resolved into an Ordinary Monthly General Meeting.

Dr. T. Oldham, President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were announced—

1. From the author, a copy of a paper "On the Age and Correlations of the Plant-Bearing Series of India, and the former existence of an Indo-Oceanic Continent," by H. F. Blanford, Esq.

From Prof. Tacchini, Memoirs of the Italian Spectroscopic Society, No. 10, October, 1875.

From M. Ph. Ed. Foucaux, a copy of "Le Religieux chassé de la communauté", a Buddhist tale, translated from the Tibetan.

From His Royal Highness the Prince of Wales, a copy of the photolithographed edition of the "Mahábháshya," in six volumes.

The following letter from Sir H. Bartle Frere, G. C. S. I., K. C. B., accompanying the donation, was read—

GOVERNMENT HOUSE, CALCUTTA.

3rd January, 1876.

SIR,—I am commanded by His Royal Highness the Prince of Wales to inform you that he has directed a copy of the “Mahábhashya” to be forwarded to you for presentation to the Society.

His Royal Highness hopes that the Asiatic Society will accept the book, as a *souvenir* of his visit, and as a mark of His Royal Highness' high estimation of the great work the Society has done and is doing in promoting the study of all the important subjects to which the labours of the Society and its members have been for so many years directed.

I am, Sir,

Your obedient Servant,

H. B. FRERE.

To the Secretary Asiatic Society, Calcutta.

The PRESIDENT drew the attention of the meeting to the six fine volumes on the table, stating that they possessed special value from the fact that they were photolithographed facsimiles of original MSS., and he proposed that the special thanks of the meeting should be tendered to His Royal Highness for his considerate remembrance of the Society.

The proposition was carried unanimously.

From the author, a copy of a work entitled “Protection of Life and Property from Lightning”, by W. McGregor.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members—

R. B. Shaw, Esq.

Col. J. F. Tennant (re-election).

The following is a candidate for ballot at the next meeting—

Jas. Crawford, Esq., B. A., Under-Secretary to the Government of Bengal; proposed by Dr. D. D. Cunningham, seconded by Capt. J. Waterhouse.

The following papers were read—

1. *An Account of the Maiwár Bhils.*—By T. H. HENDLEY, Surgeon, Jaipur, Rájputáná.

(Abstract.)

Dr. Hendley gives in this paper an account of those members of the Bhil race who reside in the ‘Hilly Tracts’ of Maiwár (Udaipur), where they have perhaps best preserved their individualities. He has been able to col-

lect a good deal of information whilst residing among them as Surgeon of the Maiwár Bhíl corps. In the chapter on the religion of the Bhíls, Dr. Hendley notices the cairns and *stháns*, which are erected on the summits of high hills, and the curious reverence of the people for the horse, which, as Sir J. Malcom says, the Bhíls worship and do not mount. Then follows a description of the customs observed at births, marriages and deaths, of the government and the agriculture of the tribe, and statistical tables containing race measurements. The Bhíl skull is but slightly dolicho-cephalic, and differs very much from the long thin-walled cranium of the pure Hindu. The chapter on Language contains an outline of Bhíl grammar, a vocabulary, and a list of proper nouns; and the paper ends with specimens of Bhíl songs.

A plate of Bhíl arms and ornaments will be published, with the essay, in No. IV. of Pt. I. of the Journal for 1875.

2. *Popular Songs of the Hamírpur District, Bundelkhand, North Western Provinces.*—By VINCENT A. SMITH, B. A., C. S.

(Abstract.)

Mr. Vincent Smith submits specimens of songs from Bundelkhand in honour of Hardaul, a son of the notorious Bir Sing Deo Bundelá, Rájá of Urcha, who was poisoned by his brother Jhájhár Sing. His ghost is worshipped in every village, and chiefly at weddings and in the month of Baisákh. Hardaul is also propitiated with songs when storms appear.

The Hindí of the songs is peculiar, and Mr. Vincent Smith has promised to favour the Society with other specimens.

The paper will appear in No. IV. Pt. I. of the Journal, for 1875.



LIBRARY.

The following additions have been made to the Library since the meeting held in December last.

1.—TRANSACTIONS, PROCEEDINGS AND JOURNALS.

Presented by the respective Societies or Editors.

Berlin. Königliche Akademie der Wissenschaften,—Abhandlungen aus dem Jahre 1874.

———. ———, Monatsbericht, Juli und August, 1875.

Peters.—Über die Entwicklung der *Cacilien*. *G. Kirchhoff.*—Über die stationären elektrischen Strömungen in einer gekrümmten leitenden Fläche.

Peters.—Über zwei Gattungen von Eidechsen, *Scincodypus* und *Sphenoscincus*.

Birmingham. Institute of Mechanical Engineers,—Proceedings, June, July, 1875.

Crossley. Dr. F. W.—On Otto and Langen's Atmospheric Gas Engine and some other Gas Engines. *G. H. Daglish.*—On direct-acting Winding Engines for Mines.

Bombay. The Indian Antiquary,—Vol. IV, Pt. 49.

Sri Krishna Sadtri Talekar.—Legendary Account of old Newssa. *Dr. A. B. Cohen Stuart.*—Sacred Footprints in Juva. *J. G. Da Cunha.*—Words and places in and about Bombay. *Miss E. Lyall.*—Táránátha's account of the Magadha kings, translated from Vassilief. *H. Blochmann.*—Inscriptions from Ahmadsábád.

Buenos Aires. Academia Nacional de Ciencias Exactas existente en la Universidad de Cordova,—Boletín, Entroga IV, 1875.

Calcutta. Christian Spectator.—Vol. V, No. 55, January, 1876.

Gravenhage. Bijdragen tot de Taal-land en Volkenkunde van Nederland-sch-Indië.—Deel, 8, Stukken 2, 3, 4. Deel 9, Stukken 1 to 4.

Deel 8. Stukken, 3, 4.—Cankara Ákára's Commentaar op de Aphorismen van den Vedááta, Vertaald door Dr. A. Bruining, met lene inleiding von Prof. H. Kern. (continued in Deel 9. Stukken 3-4.)

———. Babad Tanah Djawi, in Proza, Javansche Geschiedenis van J. J. Meinama, Erste Stuk. (Tekst).

Leipzig. Deutsche Morgenländische Gesellschaft,—Zeitschrift, Vol. 29, Heft II.

O. Böhtlingk.—Kátjájana oder Patangali im Mahábhásha. *F. Rückert.*—Aus Deshámi's Liebesliedern. *A. D. Mordmann.*—Sassanidische Gemmen. *S.*

Lefmann.—Zum Gāthādialect. *Dr. H. Jacobi.*—Ueber tajās, vāyu, ākāśa, speciell in der Vaiśeṣika Philosophie. *A. von Kromer.*—Ein Freidenker des Islam.

London. The Athenæum.—Parts 572, 573, August, September, 1875.

———. British Museum,—Catalogue of Marine *Polyzoa* in the Collection of the British Museum, Pt. III,—*Cyclostomata*.

———. Chemical Society,—Journal, Vol. XIII, August, September, and November, 1875.

August. *C. Griffin.*—On a new method of supporting Crucibles in Gas-furnaces.

W. H. Deering.—On some Points in the examination of Waters by the Ammonia method. *G. H. Beckett*, and *C. A. Wright.*—On the action of the Organic Acids and their anhydrides on the Natural Alkaloids, Pt. IV. Action of Polybasic Acids on Morphine and Codeine.

September. *J. W. Thomas.*—On the Gases enclosed in Coals from the South Wales Basin, and the Gases evolved by Blowers and by boring into the Coal itself. *J. J. Coleman.*—The effects of Pressure and Cold, on the Gaseous Products of the Distillation of Carbonaceous Shales.

October. *R. Warrington.*—Notes on the Chemistry of Tartaric and Citric Acid.

———. East India Association,—Journal, Vol. IX, No. 2.

———. Geographical Magazine,—Vol. II, Nos. 11, 12.

No. 11.—Map of a part of Central Asia showing the Routes of the Russian Hissar Expedition, the Havildar, and the Mullah, 1874-75. *H. P. Lorch.*—A Glance at the results of the Expedition to Hissar.

———. Geological Society,—Quarterly Journal, Vol. XXXI, No. 123.

Prof. Huxley.—On *Stagonolepis Robertsoni* and on the Evolution of the *Crocodilia*.

———. Institute of Civil Engineers,—Proceedings, Vol. 41, Pt. III, 1874-75.

C. Colson.—Experiments on the Portland Cement used in the Portsmouth Dockyard, Extension Works. Earthwork Experiments on the Sirhind Canal.

———. Linnean Society,—Journal, *Botany*, Vol. XIV, Nos. 77 to 80.

No. 77. *J. D. Hooker.*—Contributions to the Botany of the Expedition of H. M. S. Challenger.

No. 78. *M. T. Masters.*—Note on the Bracts of Crucifers. *W. H. Colevill.*—Some Observations on the Vegetable Productions and the Rural Economy of the Province of Bagdad. *C. B. Clarke.*—On *Hieracium Silhetense*, D. C. Notes on Indian *Gentianaceae*.

No. 79. *J. D. Hooker.*—Observations on some Indian Species of *Garcinia*. *M. T. Masters.*—Remarks on the Structure, Affinities, and Distribution of the genus *Aristolochia*, with Descriptions of some hitherto unpublished Species. Monographic Sketch of the *Durioneae*. *J. G. Baker.*—Revision of the Genera and Species of *Asparagaceae*. (Continued in No. 80.)

———. ———, Journal, *Zoology*, Vol. XII, Nos. 58 and 59.

No. 58. *J. G. Jeffreys.*—On some Species of Japanese Marine Shells and Fishes, which inhabit also the North Atlantic. *T. Davidson.*—Note on a new Species

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No. 57. *S. Haughton.*—Mechanical Work done by a Muscle before exhaustion and on the "Law of Fatigue." *R. H. Chittenden.*—On some interesting Equine Calculi. *J. W. Mallet.*—Note on the Gases accompanying Meteorites. *A. E. Ferrill.*—Notice of the occurrence of another Gigantic Cephalopod (*Architeuthis*) on the coast of Newfoundland, in December 1874.

Paris. Comptes Rendus,—Tome 71, Nos. 4—18, 1875.

No. 4. *M. J. Jamin.*—Sur la distribution du magnétisme dans les faisceaux composés de lames très-minces et de longueur finie. *M. G. Planté.*—Recherches sur les phénomènes produits par des courants électriques de haute tension, et sur leurs analogies avec les phénomènes naturels. *M. A. Renard.*—Action de l'oxygène électrolytique sur la glycérine.

No. 5. *M. J. Jamin.*—Sur les aimants formés par des poudres comprimées. *M. J. Béchamp.*—Des microzymas et de leurs fonctions aux différents âges d'un même être. *M. Arm. Gautier.*—Sur la séparation complète de l'arsenic des matières animales et sur son dosage dans les divers tissus. *M. Ord.*—Observation d'un cas de névralgie épileptiforme de la face, traitée par la section des nerfs nasal interne et nasal externe, avec anesthésie produite par injection intra-veineuse de chloral.

No. 6. *M. Lorin.*—Faits relatifs à l'étude des alcools polyatomiques proprement dits. Application à un nouveau mode d'obtention de l'acide formique cristallisable. *M. Prosper Henry.*—Découverte de la planète 148 faite à

- l'Observatoire de Paris. *M. Arm. Gautier*.—Conduite de l'appareil de Marsh ; son application au dosage de l'arsenic contenu dans les matières organiques.
- No. 7. *M. Th. du Moncel*.—Neuvième Note sur la conductibilité électrique des corps médiocrement conducteurs. Polarisation électrique des minéraux. *M. J. M. Gauguier*.—Quatrième Note sur les procédés d'aimantation.
- No. 8. *M. Le Verrier*.—Comparaison de la théorie de Saturne avec les observations. *Masse* de Jupiter. Tables du mouvement de Saturne.
- No. 9. *M. Faye*.—Sur la formation de la grêle. *M. Th. du Moncel*.—Dixième Note sur la conductibilité électrique des corps médiocrement conducteurs. *M. de Rostaing*.—Adresse la description d'une expérience constatant l'efficacité de la racine de garance pour la conservation des viandes non cuites.
- No. 10. *MM. P. Desains et Aymonet*.—Étude des bandes froides des spectres obscurs. *M. Th. du Moncel*.—Onzième Note sur la conductibilité électrique des corps médiocrement conducteurs. *M. Brault*.—Nouvelles cartes de Météorologie nautique, donnant à la fois la direction et l'intensité probables des vents. *M. N. Severtzow*.—Note à propos d'une communication précédente de *M. Faye*, sur des observations faites pendant, un orage de grêle dans l'Asie centrale.
- No. 11. *M. J. C. Watson*.—Mémoire sur les observations du passage de Vénus faites à Peking. *M. S. Cloez*.—Note sur la matière grasse de la graine de l'arbre à huile de la Chine. *M. C. Huxson*.—Sur quelques réactions de l'hémoglobine et de ses dérivés.
- No. 12. *MM. P. et H. Gervais*.—Sur une particularité anatomique remarquable du Rhinocéros. *M. Lecog de Bonbaudran*.—Caractères chimiques et spectroscopiques d'un nouveau métal le Gallium, découvert dans une blende de la mine de Pierrefitte, vallée d'Argolès (Pyrénées.) *M. J. Chatin*.—Sur le développement et la structure des glandes foliaires intérieures.
- No. 13. *M. Th. du Moncel*.—Douzième Note sur la conductibilité électrique des corps médiocrement conducteurs. *M. G. le Bon*.—Transformation du sang en poudre soluble, propriétés chimiques, physiques, et alimentaires de cette poudre. *MM. L. Mathieu, et V. Urbain*.—Remarques concernant une Note de *M. F. Glenard*, sur la coagulation spontanée du sang en dehors de l'organisme. *M. Meusel*.—De la putrefaction produite par les bactéries en présence des nitrates alcalins.
- No. 14. *M. A. Mouchot*.—Résultats obtenus dans les essais d'applications industrielles de la chaleur solaire. *M. G. Tisandier*.—Sur l'existence de corpuscules ferrugineux et magnétiques dans les poussières atmosphériques. *M. D'Arbaum-Blonzar*.—Les orages de 1875.
- No. 15. *P. A. Secchi*.—Résultats des observations des protubérances et des taches solaires du 23 avril, au 28 juin 1875 (fin.) *M. Durin*.—De l'analyse commerciale des sucres, et de l'influence des sels et du glucose sur la cristallisation du sucre.
- No. 16. *M. Th. du Moncel*.—Treizième Note sur la conductibilité électrique des corps médiocrement conducteurs.
- No. 17. *M. de Magnac*.—Progrès réalisé dans la question des atterrissages par l'emploi de la méthode rationnelle dans la détermination des marches diurnes des chronomètres. *M. A. Casin*.—Observations magnétiques faites à l'île Saint-Paul, en novembre et décembre 1874. *M. J. A. Brown*.—Note sur les relations observées à Trevandrum, entre les résultats des observations magnétiques et la période des taches solaires.

No. 13. *M. Tâ. du Moncel*.—Quatorzième Note sur la conductibilité électrique des corps médiocrement conducteurs. *M. Chauveau*.—De l'excitation électrique unipolaire des nerfs. Comparaison de l'activité des deux pôles, pendant le passage des courants de pile. *MM. V. Felts et E. Ritter*.—De l'apparition des sels biliaires dans le sang et les urines, déterminée par certaines formes d'empoisonnement.

Paris. Revue et Magasin de Zoologie,—8me Serie, Nos. 4—8, 1875.

——. Journal des Savants,—Juillet, Août, Septembre, Octobre, 1875.

Juillet. *Barthélemy Saint-Hilaire*.—La langue et la littérature hindoustanie de 1850 à 1869 et 1874.

Septembre.—*J Bertrand*—Uranographie chinoise.

Octobre.—*M. M. Chevreul*.—Études sur les quinquinas.

——. Revue Critique d'Histoire et de Littérature,—Nos. 81—44,

Juillet—Octobre, 1875

No. 31. *Leland*.—Découvert de l'Amérique par les Buddhistes.

No. 34 and 35. *Burull*—Éléments de Paléographie Indienne.

No 36. *Beal*—La Légende de Sâkya Buddha. *J. de Goege*.—l'Ancien lit de l'Oxus.

No. 44 *Muir*.—Choix de sentences religieuses et morales, traduites du Sanskrit.

——. Revue Archéologique,—Nos. 7—10, Juillet—Octobre, 1875.

——. Revue des Deux Mondes,—Tomes 10, 11, 12, Août—Novembre, 1875.

Tome 10—Les Progrès de la Russie dans l'Asie centrale et les ombrages de l'Angleterre.

5.—BOOKS PURCHASED.

BEAL, S. The Romantic Legend of Sâkya Buddha, from the Chinese.

CHILDERS, R. C. A Dictionary of the Pali Language, Pt. II.

COWELL, E. B. A short Introduction to the ordinary Prâkrit of the Sanskrit Dramas.

DARWIN, C. Insectivorous Plants.

ELLIOT, SIR H., K. C. B. The History of India as told by its own Historians, Vol. VI., ed Prof. Dowson.

GRASSMANN, H. Wörterbuch zum Rig-Veda, 5 and 6 Lieferung.

HARROLD, E. VON. Morgenlandische Forschungen. Coleopterologische Hefte XIII

JEVONS, W. STANLEY. Money and the Mechanism of Exchange.

NEUMAYER, DR. G. Anleitung zu wissenschaftlichen Beobachtungen auf Reisen.

SIMS, R. Hand-book to the Library of the British Museum.

WHITNEY, W. W. The Life and Growth of Language.

WRIGHT, T. The Celt, the Roman, and the Saxon; a History of the early inhabitants of Britain.

VOGEL, DR. H. The Chemistry of Light and Photography in its application to Art, Science, and Industry.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR MARCH, 1876.

The Monthly General Meeting of the Society was held on Wednesday, the 1st March, at 9 o'clock P. M.

T. Oldham, Esq., LL D, President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were announced :—

1. From the Government of India, Foreign Department, a copy of a "Report of Mission to Yarkand, by Sir Douglas Forsyth."

2. From Dr. T. H. Hendley, a copy of his "Guide to Jeypore."

3. From the author, a copy of an "Address delivered to the Biological Section of the British Association," by P. L. Selater.

4. From Rájá Harendra Krishna Bahádúr, a copy of a work entitled "The Indian Press on the late Rájá Kali Krishna Bahádúr, K. G. S."

5. From W. F. Blanford, Esq., a copy of the Atlas of Mining Industry accompanying Vol. III of the Records of the U. S. Geological Exploration of the Fortieth Parallel, by Clarence King.

6. From Nawáb Sayyid Siddiq Hasan Khán, Bahádúr, of Bhopál, copies of the following works :—



Itháfi-ul-nubalá il-muttaqín bi-ihyái maásir il-fuqahá il-muhaddisín ; Al-hitta fi zikr il-qibáh il-Sittah ; Táj uliqbál, Tárfkh i riyásat i Bhopál (Persian) ; Ditto ditto, (Urdú) ; Luqat ul'ajalán ; Rihlat uqdidq ila-lbait il'atíq ; Qitf ul-samár ; Alintiqád ulrajih fi sharh ili'tiqád il-qahih ; Huqúl ul mámúl min 'ilm il-uqúl , Iksár fi uqúl il-tafsír.

7. From J. Wood-Mason, Esq., a collection of photographs found among the effects of the late Dr. Stoliczka.

The following gentleman, duly proposed and seconded at the last meeting, was elected an ordinary member.

J. Crawford, Esq., B. A., C. S.

The following are candidates for ballot at the next meeting :—

Mr.  Wilson, Asst. Controller, P. W. Dept., proposed by Dr. E. W.  members, seconded by Mr. F. W. Peterson.

Kumár Kanti Chandra Sing, of Paikpárá, proposed by Maulavi Abdul Latif Khán, Bahádur, seconded by Báhu Bhuggobutty Charan Mullik.

T. E. Coxhead, Esq., proposed for re-election by Mr. H. Blochmann, seconded by Captain J. Waterhouse.

The following gentlemen have intimated their desire to withdraw from the Society—

R. Stewart, Esq., on leaving India, Capt. T. B. Mitchell, Rájá Harendra Krishna Bahádur.

The Council reported that Capt J. Waterhouse, and Mr. H. Blochmann, had been nominated Trustees of the Indian Museum on behalf of the Society, in the place of Col. Hyde, and Dr. S. B. Partridge, who had left the Council.

The PRESIDENT announced that the Council recommend Dr. Werner Siemens, and Col. Henry Yule, R. E., C. B., as suitable persons for election as Honorary Members of the Society.

The following were the grounds on which this recommendation was made:

Dr. W. SIEMENS, the elder of two brothers both famous and distinguished as practical physicists, has been from the first the most eminent and most useful of the pioneers of telegraphy. He first successfully introduced the covering of telegraph wire with gutta-percha and Indian-rubber. He recommended the first submarine telegraph through the Red Sea, in order to establish direct communication with India from Europe. When this failed and telegraphing became so imperfect that letters often reached their destinations before messages, he promoted with immense zeal and energy the Indo-European line by land, which has since worked, and is working so well, that we have the London news of the evening before, in our morning papers. He has been more instrumental than any one else in making telegraphic communication with Europe perfect, and is acknowledged to have been by far the greatest improver and perfecter of Telegraphy in general, thus becoming the general promotor of the most beneficial scientific improvement of modern times.

Colonel HENRY YULE, R. E., C. B. has, since the year 1842, been an occasional contributor to the Journal of the Society. He was elected a member in July, 1856, and up to 1861, when he retired from the service, valuable papers on the "Khási Hills, and their People," "On the ruins at Pagán on the Irrawaddi," and on the "Buddhistic remains in Java," evidenced the interest which he took in the labours of the Society. He accompanied Major,

(now Sir Arthur) Phayre, in his mission to the Court of Ava in 1855, and his preparation of the account of that mission, illustrated largely by his own artistic pencil, and accompanied by excellent maps of ancient Burmah, appears to have laid the foundation of his unceasing interest in the study of the Geography of Central Asia. The learned and valuable work on "Cathay and the Way thither," published by the Hakluyt Society, was followed by the masterly dissertation on one of the most puzzling questions of Central Asian geography, prefixed to the new edition of Wood's Journey to the Source of the Oxus. And his labours culminated in the scholarly and elaborate translation of Marco Polo's Travels, to the editing of which he brought a mass of widely extended and careful research, and an amount of erudition and knowledge perfectly unequalled in any other recent contribution to literature. A second edition, greatly extended, was published during the last year.

Other valuable papers by Col. H. Yule, have appeared in the pages of the Royal Geographical Society, London, Geographical Magazine, &c., and he now stands confessedly one of the foremost scientific Geographers of the day, particularly with reference to the earlier geographical history of China and Central Asia.

In accordance with the rules of the Society these names would be hung up in the Meeting-Room of the Society until the next ordinary meeting, when they would be balloted for.

The Council reported that the following gentlemen have been nominated by the Council to serve on the several Committees during the ensuing year.

1876.

Sub-Committee of Finance.

Bábu Rájendralála Mitra, LL. D.	R. Taylor, Esq.
E. Gay, Esq.	Colonel J. F. Tennant.

Library.

The Hon. E. C. Bayley, C. S. I.	C. H. Tawney, Esq., M. A.
Bábu Rájendralála Mitra, LL. D.	Whitley Stokes, Esq.
Colonel J. F. Tennant, R. E.	W. T. Blanford, Esq.
G. Nevill, Esq.	C. H. Wood, Esq.
A. Pedler, Esq.	Dr. O. Feistmantel.
Dr. Mohendralal Sircar.	Dr. D. D. Cunningham.
J. Geoghegan, Esq.	Bábu Prannáth Pandit.
Dr. W. K. Waller.	W. S. Brough, Esq.

Philology.

The Hon. E. C. Bayley, C. S. I.	Bábu Gaur Dás Bysack.
Bábu Rájendralála Mitra, LL.D.	Dr. Mohendralala Sirkar.
C. H. Tawney, Esq., M. A.	Maulavi Abdul Latif Khán Bahádúr.
Major-Genl. A. Cunningham, C. S. I.	Maulavi Kabiruddin Ahmad Sahib.
J. Beames, Esq.	Bábu Dijendra Nath Thákúr.
F. S. Growse, Esq.	Whitley Stokes, Esq.
Rev. K. M. Banerjya, LL. D.	Bábu Prannáth Pandit.
	Dr. G. Thibaut.

Natural History.

G. Nevill, Esq.	S. Kurz, Esq.
H. F. Blanford, Esq.	Dr. G. King.
V. Ball, Esq.	S. E. Peul, Esq.
H. B. Medlicott, Esq.	W. E. Brooks, Esq., C. E.
Dr. O. Feistmantel.	Dr. J. Scully.
D. Waldie, Esq.	Dr. W. Schlich.
A. O. Hume, Esq., C. B.	W. Theobald, Esq.
Dr. D. D. Cunningham.	R. Lydekker, Esq.
Dr. J. Armstrong.	W. T. Blanford, Esq.

Physical Science.

Col. H. I. Thuillier, C. S. I.	T. S. Isaac, Esq., C. E.
H. B. Medlicott, Esq.	Colonel J. F. Tennant, R. E.
H. F. Blanford, Esq.	Commander A. D. Taylor.
D. Waldie, Esq.	V. Ball, Esq.
A. Pedler, Esq.	Col. D. G. Robinson, R. E.
R. S. Brough, Esq.	Rev. F. Lafont.
Dr. D. D. Cunningham.	J. O'Kinealy, Esq.
The Hon. J. B. Phear.	W. T. Blanford, Esq.
A. Tween, Esq.	C. H. Wood, Esq.
W. Theobald, Esq.	Dr. J. Scully.
A. Cappel, Esq.	

Coins.

The Hon. E. C. Bayley, C. S. I.	Major-Genl. A. Cunningham, C. S. I.
Colonel J. F. Tennant, R. E.	Major F. W. Stubbs, R. A.
Bábu Rájendralála Mitra, LL. D.	Rev. M. A. Sherring.

The Secretary laid before the meeting a letter from the President and Secretary of the Committee, forwarding the programme of the 3rd Congress of Orientalists, proposed to be held at St. Petersburg in the month of

September next, and soliciting the support and presence of members of the Asiatic Society, and read the following extracts from the programme :

"The Russian Committee of organisation, acting in concert with the Permanent Committee of the 2nd Session in London have drawn up the following regulations for the ensuing Session.

"1. The International Congress of Orientalists will re-assemble for its 3rd meeting at St. Petersburg on the 1st September, 1876. The meeting will last for 10 days.

"2. The meeting will be chiefly devoted to subjects relating to Asiatic Russia. The subjects will be discussed in four sittings, the first of which will be taken up by Siberia (eastern and western), the second by Central Asia within Russian boundaries (comprising also the independent principalities of Ouzbekistan) ; the third by the Caucasus (with the Crimea and other countries in European Russia inhabited by an Asiatic population) ; the fourth by Trans-Caucasia (formerly Georgia and Armenia).

"3. At the three following sittings the Congress will consider the rest of Asia, divided into three groups : 1, Eastern Turkistan, Tibet, Mongolia, with Mantchouria and the Corea, China Proper and Japan. 2. India, Cis- and Trans-Gangetic, Afghanistan, Persian and the Indo-Chinese Archipelago ; 3. Turkey, including Arabia and Egypt.

"4. The subjects which will be considered in these seven sittings will comprise the Cartography, Ethnography, Language, History and Literature of the respective countries.

"5. The two last sittings will be devoted to questions relating 1, to the Archaeology and Numismatics of the Eastern peoples generally, and 2, to their Religious and Philosophical Systems.

"16. A summary of all the papers and communications brought before the meeting in the Russian language, as well as of the discussions carried on in that language, will be published in the Report of the Congress, in French.

"17. The Committee will publish a list of the questions to be proposed for discussion at the Congress. Any person wishing to propose any special questions relating to the East are requested to submit them in writing to the managing Committee, or to one of its corresponding members, accompanied by an abstract stating their opinions on these questions. It is only on this condition that the latter can be admitted for discussion.

"18. The International Congress of Orientalists at its 3rd meeting will only consider subjects of purely scientific interest ; consequently any communication or discussion on subjects bearing on the Christian religion or contemporaneous politics, administration, commerce and industry or which may not be included in the above mentioned programme of the meeting, will be considered as out of place and at once vetoed by the President of the sitting.

"19. Papers or communications intended to be read at the sittings of the Congress may be sent direct to the managing Committee at St. Petersburg, or to its Corresponding Members, who have been directed to forward them to the Committee.

"20. The Committee will organise during the continuance of the Congress an Exhibition of objects relating to the antiquities, and actual condition of Eastern peoples. Foreign members of the Congress will be admitted as exhibitors. The cost of transit charges to and fro will be borne by exhibitors.

"21. Admission as a member of the Congress will be granted to any person of either sex, expressing a desire to take part in the labours of the Congress and paying the subscription of 10 shillings. On payment of the subscription a member's ticket will be given, which will give the possessor admission to all the sittings of the Congress and to the attached Exhibition, as well as a right to a copy of all the publications of the meeting of the Congress.

"22. Scientific Societies may also be inscribed as such on the list of members of the Congress, with the right of being represented by a special delegate.

"23. Persons not presenting their tickets of membership will not be admitted to the sittings of the Congress or to the Exhibition.

"24. Immediately on their arrival at St. Petersburg, the members of the Congress are requested to be good enough to proceed to the office of the Managing Committee to signify their presence, enter their residence, and obtain the rules of the meeting.

"26. The liberality of the Russian Government renders it unnecessary for the Committee to admit a separate class of donor members. The subscriptions of members will be principally devoted to the publication of the proceedings of the meeting. But any donation of books, manuscripts, drawings, maps, objects of antiquity, art or curiosity, &c., will be gladly received.

"27. All scientific bodies and societies among whose members there may be some interested in Oriental studies, will be informed of the rules of the meeting and invited to take part in the proceedings of the Congress. No personal invitations will be issued.

"28. All foreign correspondence of the Committee of Management, excepting that relating to the Exhibition, will be conducted through the President of the Committee, M. W. W. Grigorief (St. Petersburg, Vasilievski-Ostrov, Volkhovskoi-Péréovlok, No. 6,) or the Secretary for Foreign correspondence, M. le Baron Victor de Rosen, Asst. Professor of Arabic at the University of St. Petersburg (Fouchatskaya, No. 25). For any business relating specially to the Exhibition, application should be made to M. Pierre Lerch, Secretary of the Imperial Archaeological Commission at St. Peters-

burgh (Vassilievski-Ostrov, Grand Perspective No. 8), who is specially charged with the organisation and management of the Exhibition.

The following paper was read :—

1. *On Human Sacrifices in Ancient India.*—By BĀBU RĀJENDRALĀLA MITRA, LL. D.

(Abstract.)

The author starts with the assumption that, however repulsive the idea of sacrificing human beings may be to modern civilization, it was not inconsistent with the different forms of religion which were current in primitive times. They all were founded on the belief of one or more supernatural beings of great power who were easily offended, but who, at the same time, were amenable to the seductive influences of coaxing and peace-offering; and all mantras, charms, prayers and sacrifices originated from, and were various forms of, coaxing and peace-offering. Human sacrifice was, in short, the natural result of assigning human attributes to the Divinity, and it proceeded under different circumstances from anthropopathy, devotion, penance, rejoicings, vindictiveness, expediency, respect for the dead, necromancy, vows, and a desire to avert an evil or secure a coveted object by divine or supernatural intervention. To illustrate these points, the author quotes largely from different works showing that sacrifices of human beings were made by the Greeks, Romans, Egyptians, Assyrians, Chaldeans and almost all other ancient nations. He then discusses the true character of the story of Sunahšepha as given in the Vedas, and comes to the conclusion that the sacrifice there referred to was real and not typical, as supposed by Wilson, Rosen and other European orientalists. Extracts are then given from the White Yajur Veda, the Taitirīya Brāhmaṇa, the Srauta Sūtras of Apastamba and Kātyāyana, and the Kālikā Purāṇa to show the various phases through which the odious practice of sacrificing human beings had passed in India.

The Rev. Dr. K. M. BANERJEA said :—The theory which Bābu Rājendralāla has propounded on the origin of human sacrifices in the world would, if discussed at large, lead to a theological debate not suitable at a place like this. I will therefore content myself with saying that I cannot assent to such a dogma—certainly not in the sweeping manner in which it has been propounded. I do not deny that human sacrifices have prevailed among most nations of the world—but probably not in primitive times—nor among the Jews, *as Jews*, at any time. The offering of Isaac was a simple trial of faith, not followed by actual slaughter—nor was it indicative of an inhuman custom. The offerings to Moloch were professedly the consequences of *lapses to open idolatry*, and so far *unJewish*. But I

will confine myself to the proper subject of the paper as notified beforehand, *viz.*, "Human Sacrifices in Ancient India." I do not know in what sense the learned essayist has used the term "Ancient India." I do not deny that human sacrifices have prevailed in the country, but that was long after the *primitive* Vedic period. My friend has referred to the Rig Veda, but he has admitted that the verses to which he has called attention do not themselves conclusively prove the fact. But he seems to think that those verses, coupled with the comment of the Aitareya Bráhmaṇa, do prove his case. I beg to dissent from him. The case is that of Sunahsépha, but, like Isaac, he was let off. It was not *in effect* a case of human sacrifice. What it might have been *in the intention* is a question difficult of solution. The difficulty is raised in the Aitareya Bráhmaṇa itself, which my friend has adduced as his evidence. It speaks of *Purusha-medha*. Now "purusha" is not synonymous with *man*. It only means a *person*. We have in the Rig Veda the account of the sacrifice of primeval "purusha, begotten in the beginning," (*purusham jätamagratah*). We have also the Vedic dogma—"The Lord of the Creation offered himself as a sacrifice." I believe this dogma and the description of the sacrifice of the *Primeval purusha* proceeded from hazy recollections of the original revelation of "the Lamb slain from the foundation of the world." That is my belief but I will not discuss it here. So much for the word "purusha." Now as to the word *medha*, my friend's own witness, the Aitareya Bráhmaṇa itself, used it in the sense of that part or essence of an animal body, which alone can be acceptably offered as a sacrifice, *and it can be abstracted without loss of life to the animal*. The Aitareya Bráhmaṇa refers not only to the case of a *Purusha-medha*, in which the person was dismissed alive, after the *medha* had escaped from his body, but also to numerous cases of animals which were produced as victims, but released on the *medha* escaping from them. "Medha" is a peculiar sacrificial term. It seems to correspond to the Hebrew *meha* which, as an adjective, signifies *fat*, and is applied to sacrificial animals, such as sheep and lambs. The substantive form *moha* means *marrow*. That is also the sense in which, according to the Inscriptions, the word *mahe* was used by the Assyrians. But, as the Aitareya Bráhmaṇa itself shows, the *medha* can escape without the animal being slaughtered. What this means I cannot readily say. It is certain, however, that the use of the term "purusha-medha" is little or no proof of the actual sacrifice of a man, much less of the existence of an inhuman custom or institution among our primitive ancestors.

I do not deny that some time after the Vedic period such inhuman practices did prevail as offerings to Sakti in her blackest form. I acknowledge also that solitary instances, rare in themselves, of a sort of religious suicide, may likewise be found, apart from offerings to Káli, in the post-Vedic period, as in the case of Sarabhanga in the age of the Rámáyana.

The Hon. E. C. BAYLEY said that while he agreed with Dr. Banerjee that Bábu Rájendralála had gone a good deal beyond what he proposed as the subject matter of his paper, and had travelled on to ground which was possibly beyond the province of the Society, nevertheless Mr. Bayley thought that some at least of his propositions were not open to dispute.

It was no doubt true that human sacrifice was in many cases due to the desire of propitiating the Gods by the sacrifice of the sacrificer's dearest possessions, as for example was the case in the well known history, curiously brought into prominence by the recent discovery of the "Moabite Stone," of Mesha, king of Moab, who sacrificed his son on the walls of his beleaguered city to obtain relief from the danger which pressed upon him.

That this principle was carried also to the extent of inducing the sacrifice of a man's own life to propitiate the Deity, was a fact of which contemporary evidence might be had. Mr. Bayley had, on one occasion, official cognizance of a case in which an unfortunate Hindu, suffering terribly from leprosy, had caused himself to be buried alive, in the hope that by this act of self-immolation he might in a future state of existence escape his terrible disease, and in which case two men were punished for assisting him thus to commit suicide. On the other hand some of the instances to which Bábu Rájendralála had alluded, could hardly come under the head of sacrifice, such for example as the alleged destruction by the Emperor Napoleon the First, of the sick who embarrassed his army—there were many well known similar instances of wholesale and wanton destruction of human life, which certainly partook in no way of the character of sacrifice, as for example, the massacres of his prisoners by Timur, near Dehli and elsewhere; and, in very recent times, the story of the barbarous Turkoman who erected a pyramid of human skulls, and murdered the unfortunate Schlagintweit to obtain his head for the apex of it. It was not, however, Mr. Bayley's purpose to enter into the general questions raised, but rather to call the attention of the meeting to a fact which gave to the theories propounded a substantial existence and a local colouring, and which also would give a tolerably accurate and remote date for the practice of human sacrifice amongst a Hindu community.

Twelve years ago Mr. Bayley had the honor to furnish to the Society a number of drawings of sculptures brought from the ruins of Jamalgiri, near Peshawar, and which were of the class now known as Eusofzye sculptures. They were published, with a brief account of them, in the 21st Volume of the Society's Journal, and opposite p. 621 of that Volume would be found a lithograph* of a sculpture which Mr. Bayley believed undoubtedly to represent a human sacrifice. The original† (which unfortunately perished

* From a drawing by the late Sir Herbert Edwards.

† It was cut in a coarse blue slaty limestone and was in imperfect preservation, four parts of the surface were scaled off as the drawing shows.

ed in the fire at the Indian Department of the Crystal Palace) was not indeed found at Jamalgiri but at Pesháwar, and was sent to him with most of the other sculptures by the late Lieutenant S. W. Stokes, of the Bengal Artillery. But though not actually coming from the same place as the other sculptures, it clearly was of the same class, both in general character, design, and in many of the details, though of less skilful work and probably therefore of rather later date.

The centre figure in the group (which contains four persons), is represented with a closely shaven head. This is a frequent characteristic of figures in the groups of Eusofzye sculptures and is supposed, with much probability, by General Cunningham to indicate that the person intended to be represented as a Buddhist monk. In this instance this person is the victim who is naked, and the others are represented in the act of binding him down to a kind of altar of open stone or brick work. Of the threefold cords, one is drawn across the victim's throat, another round his waist. The feet apparently are still free, but the sculpture was in this part imperfect. The victim is represented as struggling or remonstrating, and one of the other figures appears, while restraining his struggles with his left hand, to be in the act of striking with his right hand, in which apparently some weapon was figured.

The dress of the other figures is that ordinarily shown on the Eusofzye sculptures and was, no doubt, the local costume of that day in the neighbourhood of Pesháwar, as indeed in some respects it still is.

It would be safe, therefore, Mr. Bayley thought, to take this sculpture as representing the immolation of a captive Buddhist monk by his Hindu enemies.*

Probably from its general resemblance to other sculptures undoubtedly Buddhist, it was of Buddhist origin, and was intended to represent the death of some early martyr to that faith.

But at any rate there seemed no reason to doubt that it represented an human sacrifice in a Hindu country, and that it is of early date.

The only inscription yet found among the Eusofzye sculptures bears a date which both General Cunningham and Professor Dowson concur in attributing to the middle of the first century of the Christian era. And it is safe at least to assign the bulk of the Eusofzye sculptures to this date: from internal evidence, Mr. Bayley would have been himself disposed to consider them of somewhat earlier origin, but no doubt Mr. Fergusson on the

* An instance, that is to say, of the sacrifice of a human captive the firstfruits of a victory as Bábu Rájendralála suggests either as an indication of gratitude or perhaps rather in this instance as it seems to me, the immolations of one regarded by the gods as hostile or in order to please or appease them.

same evidence, had before the discovery of the inscription assigned them to the commencement of the Christian era.

The present sculpture might be two or three centuries later, or its inferior character might be partly due to its belonging to a minor class of building, as the inferior material used seemed to indicate. Still Mr. Bayley thought that it would not be safe to assign it to a later date than the 8rd or 4th century of the Christian era, and if his interpretation of it were correct, it would suffice to prove the existence of human sacrifice among a Hindu race at least as early as the epoch at which he presumed it to have been executed.

BÁBU RÁJENDRALÁLA MITRA said, he was sorry that there should be a misunderstanding as to what he had meant by the word "ancient." He had used the word in the sense in which historians generally employ it, namely, to indicate all time anterior to the 6th century of the Christian era, taking the period from the 6th to the 14th century to be the middle ages, and all after the last date to be modern. He was perfectly well aware that the practice of casting infants into the waters of the Hughli near Sagar Island was most probably of mediæval origin, and in referring to it, his object was to point out, that what was common in the middle ages and modern days, was not *in se* improbable in earlier times, and not to adduce it as an instance of ancient usage; though he strongly suspected that the sacrifice of Sunahsépha was the type on which the modern rite was founded.

He was not, he admitted, sufficiently well up in Biblical learning to enter into a discussion as to the true meaning of Abraham's offer of Isaac as a sacrifice, nor was he disposed to raise a polemical controversy; but to his lay understanding, the offer, without any expression of compunction, was a remarkable fact, and certain it was that when the offer was made, there was no reservation, nor any prospect or hope of the offer not being accepted, and in so far, the case was a parallel one to that of Sunahsépha. In the case of Jephtha, the rash vow to make a "burnt offering" was brought to its tragic close by the immolation of his own daughter, "while the Spirit of Jehovah," we are told, was upon him, and that clearly showed that the Jews could, and did, sacrifice human beings in the name of religion. Doubtless there were many passages in the Old Testament which reprobated "the shedding of innocent blood," as in Deuteronomy xii, 31, and elsewhere, but they did not deter Jephtha. The legend of Jephtha is supposed by some to be an adaptation of that of Iphigenia, but it does not alter the charge against the Jews.

As regards the story of Sunahsépha, the Bábu would, for the credit of his ancestors, gladly accept the European theory on the subject, if he could, but he felt it impossible to reconcile the details of the story with its supposed symbolical character. A man has a hundred wives, but no children;

he prays the water-god Varuna for children, promising to give up the first-born to the god; a child is born, and Varuna claims it; the father evades fulfilling his promise under one pretext or another, until the child, grown up to man's estate, runs away from home to escape being sacrificed; the god, disappointed, afflicts the father with dropsy; the son, mindful of his filial duty, returns home to save his father, and, meeting a poor Bráhmaṇ in the way, buys one of his sons for a hundred head of cattle to offer him as a substitute; and the victim ultimately escapes through the intervention of certain gods. Now, eliminate the element of danger from this story, and the dramatic and sensational character of the whole would be at once destroyed. If the sacrifice were a symbolical one, why should the man fail to redeem his promise? There would have been no harm done to his son by repeating a few mantras over him. The son had no reason to run away from home, and to buy a substitute; and the substitute, a grown up man well versed in the details of sacrifice, had no business to bewail his lot, to forsake, in disgust, his father who had sold him, and to become the adopted son of a stranger and a man of a lower caste.

The Báhu could not also subscribe to the interpretation of the word *Purushamedha* suggested by the Rev. K. M. Banerjea, as the Śatapatha Bráhmaṇa of the White Yajur Veda had defined it differently, and no one in the present century could consistently adopt a different interpretation. The enquiry was, as to what the Veda itself meant by the word, and not what could be made of it by the aid of philology. •

The story in the Aitareya Bráhmaṇa, which referred to the passing of that part of a man which was fit for offering successively to a horse, to an ox, to a sheep, to a goat, and lastly to the earth, was purely allegorical, and intended to eulogise the value of rice offering, and did not set aside the animal sacrifices. The goat was never set aside, and yet it comes under the same category with the horse, which too, if the Vedas are to be at all believed, at one time formed an important subject of sacrifice.

The PRESIDENT, in closing the discussion, expressed the obligation of the Society to Báhu Rájendralála Mitra for his paper, as for the discussion it had elicited. Much had been said of the meaning of the word 'ancient,' and in every statement care was taken to give the date of the story or sculpture, referred to. To him, however, this seemed a matter of the most secondary importance. Human sacrifice had existed in this country and in others, from the earliest times, and were it not checked by the strong arm of the law, would exist to the present day largely and comparatively widely. In truth, he was not aware of the existence of any race of human beings, among whom human sacrifice had not existed at some period of their history. It had been said to-night that the Persians were an exception; he must doubt it, and if there were no evidence of it among that people, this

must, he thought, arise from the imperfection of the records, not from the absence of the custom. Our own ancestors, much as we were naturally disposed to plume ourselves on our humanity, unquestionably offered human sacrifices. And the natural conclusion, the inevitable conclusion, he thought, of the study of the history of the human race was, that this custom was not confined to any special times, was not a question of centuries, or of epochs but was in every case, a question of the state of co-ordinate civilization and thus might exist in one nation, or in one tribe or part of a nation, many centuries after it had disappeared from others.

The PRESIDENT said, before the meeting closed, he was anxious to say a few words on a matter of very considerable importance to the Society. The Members were fully aware of the arrangements which had been made with the Government of India, by which the Asiatic Society was to have provided for it in the new Indian Museum, apartments fitted for its accommodation and use: also of the strict supervision, which the Society, as Trustees for the public, had secured over the valuable collections, which they handed over to the safe keeping of the Trustees of the New Museum. Then recently, the Government of India had found that the demands for space in that building were more extended than had been supposed. And they have proposed that the Asiatic Society should give up their right to the rooms which had been appropriated for their use, and should accept in lieu thereof a sum of money supposed to represent the value of the house and premises now occupied by the Society, and which is their property. This house and premises would have been a certain source of steady income to the Society. A new Act of the Legislature was requisite for this purpose, and in the preparation of this Act some slight alterations had been introduced. The principal of them was, that the number of Trustees was increased, and the right of nomination of an additional Trustee was secured to the Society, making the number to be nominated by that body five; the President for the time being, and four other Members, instead of four as at present.

The same right of property in the collections handed over, and power of resuming these, in the event of the Museum not being maintained, were contained in the new Act, as in the former one. And practically the rights of the Society continue as they were.

This proposal on the part of the Government when submitted to the Council of the Society, received their unanimous assent, and they have expressed their willingness on behalf of the Society to accept the terms. A Bill has been introduced into the Legislative Council, to legalize the proceedings, and it is hoped, that before the close of the present month, it may be completed. The whole will then doubtless be formally laid before the Society.

The meeting then adjourned.

LIBRARY.

The following additions have been made to the Library since the meeting held in February last.

TRANSACTIONS, PROCEEDINGS AND JOURNALS.

Presented by the respective Societies or Editors.

Berlin. Königlich Preussische Akademie der Wissenschaften,—Monatsbericht, September, October und November, 1875.

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Birmingham. Institution of Mechanical Engineers,—Proceedings, July, Pt. II, 1875.

T. N. Robinson.—On Wood-Working Machinery. *Sir J. Whitworth*.—On Fluid Compressed Steel and Guns.

Bombay. Bombay Branch of the Royal Asiatic Society,—Journal, Vol. XI, No. 81, 1875.

E. Perce.—A Description of the Mokranee-Beloochee Dialect. *Hon. Rao Sahab P. N. Mandlik*.—Sangamesvara Māhātmya and Linga-worship. *J. G. da Cunha*.—Memoir on the History of the Tooth-relic of Ceylon. *E. Rehatsek*.—The subjugation of Persia by the Moabites, and the Extinction of the Sāsānian Dynasty. *J. F. Fleet*.—Old Canarese and Sanskrit Inscriptions relating to the Chieftains of the Sindavamsa.

Bombay. The Indian Antiquary,—Vol. V, Pts. 50, 51, 52.

Pt. 50. *Prof. C. H. Twomey*.—Metrical Translation of the Vairāgya Sātakam, or hundred Stanzas on Asceticism by Bhārtṛhari. *W. F. Sinclair*.—Notes on some parts of the Ahmudnagar Collectorate. *J. F. Fleet*.—Sanskrit and old Canarese Inscriptions. *M. J. Walhouse*.—Archæological Notes.

Pt. 51. *J. T. Fleet*.—A Chronicle of Toragal. Sanskrit and old Canarese Inscriptions, continued, Nos. XI, XII. *M. J. Walhouse*.—Archæological Notes.

Pt. 52. *Prof. C. H. Twomey*.—Metrical Version of Bhārtṛhari's Vairāgya Sātakam. *J. F. Fleet*.—Sanskrit and old Canarese Inscriptions. Nos. XIII, and XIV. *J. Burgess*.—The Dhātāsīva Rock Temples. *Sir W. Elliot*.—Notice of a Sculptured Cave at Undāpalli in the Gantūr District. *J. W. M'Crindle*, *M. A.*.—Translation of the Indica of Arrian.

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Dr. Waagen.—The Cephalopoda (Ammonitidae).

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Wynne.—Trans-Indus Salt Region, Kohat District.

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Liverpool. Literary and Philosophical Society,—Proceedings, No. 29, 1874-75.

J. A. Picton.—On the Origin and History of the Numerals. *Rev. W. Kennedy-Moore*.—Oriental Pantheism and Dualism. *R. Leigh*.—The Yang-Tse-Keang River of Asia.

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No. 1. *Major H. Wood*.—On former Physical Aspects of the Caspian. *D. Ker*.—Is it possible to unite the Black Sea and the Caspian?

No. 2. Introduction of the Cultivation of Caoutchouc-yielding Trees into British India. *Prof. H. H. Giglioli*.—Dr. Beccari's Recent visit to New Guinea.

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H. F. Blanford.—On the Age and Correlations of the Plant-bearing Series of India, and the former Existence of an Indo-Oceanic Continent. *Prof. Owen*. On *Prorastomus sirenoides*.

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E. B. Cowell, and *J. Eggeling*.—Catalogue of Buddhist Sanskrit Manuscripts in the Possession of the Royal Asiatic Society. *T. H. Blakesley*.—On the Ruins of Sigiri in Ceylon. *J. F. Dickson*.—The Pātimokkha, being the Buddhist office of the Confession of Priests. *E. C. Childers*.—Notes on the Sinhalese Language. No. 2, Proofs of the Sanskrit Origin of Sinhalese.

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II.

No. 1. Spectroscopic Observations made at the Royal Observatory, Greenwich, by the Astronomer Royal. *Col. J. F. Tennant*.—Note on a Successful Attempt to support a Mercury Trough by a compact and easily removable arrangement. Note on Prof. Fritchard's Ephemeris of Circumpolar Stars.

No. 2. *Rev. S. J. Perry*.—Manila Photographs of Transit of Venus. *M. A. Martin*.—On the silvering of Glass by Inverted Sugar, for Optical Instruments and Experiments. *Prof. Zenger*.—On Celestial Photography. *Prof. Fritchard*.—Remarks upon two papers by Col. Tennant.

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H. N. Moseley.—On the Anatomy and Histology of the Land-Planarians of Ceylon, with some Account of their Habits, and a Description of two new Species, and with Notes on the Anatomy of some European Aquatic Species. *J. Tyndall*.—On the Atmosphere as a Vehicle of Sound. Pt. II. *F. A. Abel*.—Contributions to the History of Explosive Agents. *W. Roberts*.—Studies on Biogenesis. *J. Norman Lockyer*.—The Bakerian Lecture. Researches in Spectrum-Analysis in Connexion with the Spectrum of the Sun, Nos. III, IV. *J. N. Lockyer and W. C. Roberts*.—On the Quantitative Analysis of certain Alloys by means of the Spectroscope. *H. F. Blanford*.—The Winds of Northern India, in relation to the Temperature and Vapour-constituent of the Atmosphere. *H. E. Roscoe*.—On a Self-recording Method of Measuring the Intensity of the Chemical Action of Total Daylight. *W. C. Williamson*.—On the Organization of the Fossil Plants of the Coal measures.

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Prof. Wyville Thomson.—Report to the Hydrographer of the Admiralty on the Cruise of H. M. S., "Challenger," from June to August, 1875. *J. Priestley*.—On the Physiological Action of Vanadium. *F. W. Ivy*.—On the Production of Glycosuria by the Effect of Oxygenated Blood on the Liver.

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—, The Anatomy of the Lymphatic System. By E. Klein,

M. D.

—, Institution of Civil Engineers,—Proceedings, Vol. 42, Pt. 4, Session 1874-75.

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Heft. I. v. *Pettenkofer*.—Ueber ein Reagens zur Unterscheidung der freien Kohlensäure im Trinkwasser von der an Basen gebundenen.

Heft. II. v. *Jolly*.—Ueber die elektrische Influenz auf Flüssigkeiten von A. Wullner. *Fou*. Ueber die Erweiserssetzung im Thierkörper bei Transfusion von Blut und Eiweißlösungen von J. Forster. *Beetz*.—Ueber das doppelte Maximum in der Häufigkeit der Gewitter während der Sommermonate von W. v. Bezold.

Munich. K. B. Akademie der Wissenschaften.—Philosophische, philologische und Historische Classe—Sitzungsberichte, Band I, Heft. 2, 3, Band II, Heft. 1.

Band I, Heft. 2. *Trumpp*.—Über den Accent und die Aussprache des Persischen.

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P. Injous.—Artificial Puzzoluna made of Burnt Clay. Indian Railway Traffic. *F. Cox*.—The use of Concrete in India. *W. Parker*.—Formation of a Harbour at Madras.

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BOOKS AND PAMPHLETS.

Presented by the Authors.

BLANFORD, H. F. On the Age and Correlations of the Plant-Bearing Series of India, and the former Existence of an Indo-Oceanic Continent.

- DINA NATH SEN, BĀBU. A Scheme for the School of Industry or Practical Science, proposed to be established in Calcutta, from Funds raised by the Indian League, with Government Aid.
- FOUCAUX, PH. ED. Le Religieux chassé de la Communauté, Conte Boudhique traduit du Tibétain, pour la première fois.
- GODWIN-AUSTEN, MAJOR, H. H. Description of a supposed new *Suthora* from the Dalla Hills, and a *Minla* from the Nágá Hills, with remarks on *Pictorhis* (*Chrysomma*) *altirostre*, Jerdon.
- HENDLEY, DR. T. H. The Jeypore Guide.
- MCGREGOR, W. Protection of Life and Property from Lightning during Thunderstorms.
- SCLATER, P. L. Address delivered to the Biological Section of the British Association, Bristol, August 1875.
- TASSY, GARCIN DE. La Langue et la Littérature Hindoustanie en 1875. Revue annuelle.

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GOVERNMENT OF INDIA, FOREIGN DEPT

- Report on the Administration of Bengal, 1874-75.
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Curator's Report.

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Theory of the Moon's Motion. By Jno. N. Stockwell, M. A.

SMITHSONIAN INSTITUTION.

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BÁBU PRANNÁTH PANDIT.

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L. W. Thomé.—Zur Theorie der linearen Differentialgleichungen. L. Pochhammer.—Beitrag zur Theorie der Biegung des Kreiscylinders. A. Oberbeck.—Ueber stationäre Flüssigkeitsbewegungen mit Berücksichtigung der inneren Reibung.

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No. 96. H. N. Moseley.—On a young Specimen of *Polygonemertes Rollestoni*. Rev. O. P. Cambridge.—On three new and curious Forms of *Arachnida*.

No. 97. Major H. H. Godwin-Austen.—Description of a supposed new *Suthora* from the Dacca Hills, and a *Minla* from the Nágá Hills, with remarks on *Pictorhis (Chrysomana) altirostre*, Jerdon. J. Wood-Mason.—On a gigantic Stalulating Spider.

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Vol. 50, No. 333. E. Bunsen.—Spectral, Analytical Researches. Dr. J. Kerr.—A new Relation between Electricity and Light; Dielectric Media Birefringent. L. Schaeffler.—On the General Theory of Duplex Telegraphy.

No. 334. E. M. Bosanquet.—On the Polarization of the Light of the Sky. E. Bunsen.—Spectral-Analytical Researches. W. Weston.—The Application of Phosphorus to the "Poling" of Copper.

Vol. I, No. 1. *O. Heavinside*.—On Duplex Telegraphy. *J. W. L. Glaisher*.—On the Representation of an Uneven Number as a sum of four Squares, and as the sum of a Square and two Triangular Numbers. *S. H. Burbury*.—On the Second Law of Thermodynamics in connexion with the Kinetic Theory of Gases. *T. H. Martin*.—On the Production of Spectra by the Oxyhydrogen Flame. *Prof. R. Clausius*.—On a new fundamental Law of Electrodynamics.

London. Numismatic Society's Journal,—Pt. III, 1875, New Series, No. 59.

H. C. Kay.—A Gold Coin of Abū Ishāk Ibn Mahmūd Shāh Inchū. *S. L. Poole*. Unpublished Coins of the Kakweyhis.

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E. R. Lankester.—Further Observations on a Peach or Red-coloured Bacterium, *Bacterium rubescens*. *H. C. Sorby*.—On the Evolution of Hemoglobin.

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Recent Chemical Researches. On the Colouring of the Shells of Birds' Eggs.

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No. 1202. *A. Smith*.—Proposed Heads of Legislation for the Regulation of Sewage grounds.

No. 1205. *J. L. W. Thudichum, M. D.*—On the Discoveries and Philosophy of Liebig, with special reference to their influence upon the advancement of Arts, Manufactures and Commerce. Pts. I, II, III.

No. 1206. The Cultivation of Useful Plants in India—Opium in China.

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New Haven, U. S. The American Journal of Science and Arts,—Vol. X, No. 59.

R. Paus.—Specific gravity Balance. *O. C. Marsh*.—On the Odontornithes or Birds with teeth.

Winkler.—Use of Salicylic Acid in Titration.

Paris. Comptes Rendus,—Tome 81, Nos. 19—26, 1875.

No. 19. *M. A. Commaille*.—Note sur le dosage de la caféine et la solubilité de cette substance. *M. Ore*. De l'influence des acides sur la coagulation du sang.

No. 20. *M. Th. du Moncel*.—Quinzième Note sur la conductibilité électrique des corps médiocrement conducteurs. *M. E. Duchemin*.—Emploi du nickel déposé par voie électrique pour protéger contre l'oxydation les aimants servant à la construction des boussoles. *W. Fr. Glénard*.—Sur le rôle de l'acide carbonique dans le phénomène de la coagulation spontanée du sang.

No. 21. *M. Ch. Sainte-Claire Deville*.—Sur la périodicité des grandes mouvements de l'atmosphère. *M. P. Gervais*.—Remarques sur les Balénides des mers du Japon à propos du crâne d'un Cétacé de ce groupe, envoyé au Muséum par le gouvernement japonais sur la demande de *M. Janasson*. *M. Oré*. De l'action qu'exercent les acides phosphoriques monohydraté et trihydraté sur la coagulation du sang.

No. 22. *M. G. Lombroso*.—Du principe vénéneux que renferme le maïs avarié, et de son application à la pathologie et à la thérapeutique. *M. Edm. Perrier*. Sur les vers de terre des îles Philippines et de la Cochinchine.

- No. 23. *M. D. Mendelief*.—Sur la température des couches élevées de l'atmosphère. *M. E. Allard*.—Sur la transparence des flammes et de l'atmosphère et sur la visibilité des feux scintillants. *M. P. Schutzenberger*.—Recherches sur la constitution des matières albuminoïdes. *M. Signol*.—Sur l'état virulent du sang de chevaux sains, morts par assommement ou asphyxie. *M. M. Tive et Durassier*.—Note sur la distribution du magnétisme à l'intérieur des aimants. *M. P. Carbonnes*.—Nidification du poisson arc-en-ciel, de l'Inde.
- No. 24. *M. J. Jamin*.—Sur les lois de l'influence magnétique. *M. Janssen*.—Note accompagnant la présentation de plaques micrométriques destinées aux mesures d'images solaires. *M. Lortet*.—Sur un poisson du lac de Tibériade, le *Chromis paterfamilias*, qui incube ses œufs dans la cavité buccale. *M. Jobert*.—Recherches sur l'appareil spiratoire et le mode de respiration de certains Crustacés brachyures. *M. A. Crova*.—Sur l'intensité calorifique de la radiation solaire et son absorption par l'atmosphère terrestre. *M. G. Tissandier*.—Observations météorologiques en ballon.
- No. 25. *M. J. Jamin*.—Formule de la quantité de magnétisme enlevée à un aimant par un contact de fer, et de la force portative. *M. Edm. Perrier*.—Sur la classification et la synonymie des Stelléides.
- No. 26. Annual Address by M. Frey, President of the Academy.
- Paris. Journal des Savants,—Novembre, 1875
- . Revue Archéologique,—Nos. 11, 12, Novembre, Décembre, 1875.
- . Revue Critique d'Histoire et de Littérature,—Nos. 45, 48, 50, 52, Novembre, Décembre, 1875.
- No. 48. *Monier Williams*.—La Sagesse des Hindous.
- Nos. 50, 51. Hymnes der Rig Veda, tr. p. Geldner et Kaegi, avec le concours de Roth.
- . Revue des Deux Mondes, Tome 12, Pts. III, IV, Décembre, 1875, Tome 13, Janvier, Pt. I, 1876.
- Tome 12, Pt. III. *M. J. Ninet*.—Les floteurs Anglais et la culture du coton en Égypte. *M. A. Geffroy*.—Une nouvelle histoire de l'ancien Orient classique.
- Tome 13, Pt. I. *M. G. Falbert*.—L'Angleterre et le Canal de Suez.
- . Revue et Magasin de Zoologie,—3^e Série, Nos. 9—11, 1875.
- Nos 9 and 11. *Fieber*.—Cicadines d'Europe.

BOOKS PURCHASED.

- FALLON, S. W. A new Hindustani—English Dictionary, with illustrations from Hindustani Literature and Folk-Lore, Pts. I, II.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR APRIL, 1876.

The monthly General Meeting of the Society was held on Wednesday the 5th April, 1876, at 9 o'clock P. M.

Col. H. L. Thuillier, C. S. I., Vice-President, in the Chair.

The minutes of the last meeting were read and confirmed.

The following presentations were announced—

1.—From Pandit Brahma-vatra Samadhyayi, a copy of *Srimadvagata-tam*, with commentary, Sridharasvami, Nos. 1 to 3 and 5 to 8, and a copy of the “*Sama Veda Sanhita (Chanda Archika)*”.

2.—From Dr. T. Oldham, several numbers of the *Journal and Proceedings*.

3.—From the Hon'ble E. C. Bayley, C. S. I., 9 volumes of the *Journal*, and 7 of the *Proceedings*.

4.—From the Marquis Doria, Genoa, Vols. 2 to 6 of the “*Annali del Museo Civico di Storia Naturali di Genova*”.

5.—From Dr. T. Oldham, two gold coins, forwarded by Mr. W. Bourne, and two copper coins.

Mr. BLOCHMANN said—The two gold coins, presented to the Society by Mr. Bourne through Dr. Oldham, were a Dutch ducat of 1818, and an old Venetian sequin, a facsimile of which was published by Mr. Burgess in his “*Indian Antiquary*”, Vol. II, 1878, p. 218. Mr. Bourne's specimen, however, was no forgery. These coins were of interest from the fact that they had been obtained in the Jain temple of Baidyanáth, near Deogarh, where they had been deposited as offerings by some pilgrims.

The other two coins presented by Dr. Oldham are two small Muhammadan copper coins. The legend is scarcely legible: on one of them he could make out the name Ibráhím. Mr. Wynne, who obtained them from Dadji, Thakur of Nurrha, Kachh, says they are pice of the coinage of the Rájá Vigo or Vigu, found 40 years ago at the ruins of Vigu Kot, half way between Ramáo ke Bázár and Sindri, near the Allah Band, the embankment in the Ran of Kachh formed during the earthquake of 1818.

6.—From Bábu Rájendralála Mitra, LL. D., four leaves of an illuminated MS. of the Kalpa Sutra of the Jains, about 400 years old.

7.—From E. Gay, Esq. a copy of a work entitled "Purchas his Pilgrimage, or Relations of the World and the Religions observed in all Ages and Places."

Mr. BLOCHMANN said this appeared to be a copy of the original edition of 1614 and would be a great acquisition to the Library. The Society were much indebted to Mr. Gay for this and former presentations of valuable and scarce works.

The following gentlemen, duly proposed and seconded at the last Meeting, were balloted for and elected ordinary members—

Mr. A. Wilson.

Kumar Kanté Chunder Sing of Paikpara.

Mr. T. E. Coxhead.

Dr. Werner Siemens, Berlin, and Col. Henry Yule, R. E., C. B., proposed by the Council at the last Meeting as Honorary Members, were balloted for and duly elected.

Before the commencement of the ballot, the Chairman said that perhaps the meeting might expect a few words of explanation as to the proposition submitted that evening for filling up the vacancies in the list of honorary members of the Society. The Council had given this subject their very careful consideration, and had much confidence in submitting for election the names of Dr. Werner Siemens and Colonel Henry Yule, C. B., Member of the Indian Council in London. The grounds on which the Council founded their recommendation of these gentlemen had been duly placed before the Society, and as the nomination had been advisedly made after mature deliberation, the Council trusted that they would meet with the full support of the meeting and of the Society.

The following are candidates for ballot at the next meeting.—

Surgeon Major A. F. Bradshaw, Surgeon to H. E. the Commander-in-Chief, proposed by Col. C. Dickens, R. A., seconded by Col. H. Drummond, R. E.

Mr. John M. Lyall, proposed by Col. J. E. Gastrell, seconded by Capt. J. Waterhouse.

Mr. A. M. Nash, M. A., Professor, Presidency College, Calcutta, proposed by Mr. H. Blochmann, seconded by Col. J. E. Gastrell.

The following gentlemen have intimated their desire to withdraw from the Society—

Messrs. H. Williams, Chester Macnaghten, W. Theobald, Walter Bourne, A. Tweena (on leaving India), and Rájá Harendra Krishna Bahádúr.

The CHAIRMAN said that he had to inform the meeting that in consequence of the departure from India of their esteemed and valued President, Dr. Thomas Oldham, the Council of the Society had considered it their duty to record their unfeigned regret at the great loss which the Society thus sustained by Dr. Oldham's departure on the severance of his connection with the Government service in this country. He was sure that the feelings and sentiments which unanimously actuated the Council would be shared in by the Meeting and the Society at large, and as this was the last occasion on which an opportunity would present itself of considering the late President's long and valuable services, he felt great pleasure in thus prominently bringing before them, the imperfect tribute to Dr. Oldham which the Resolution of the Council attempted to convey. The Resolution was as follows :

Resolved that the Council of the Asiatic Society record the feeling of unfeigned regret with which they accept Dr. Oldham's resignation of the post of President, a regret intensified by the disappointment of the earnest anticipations and hopes of the Council that Dr. Oldham's recent visit to Europe would have given him renewed strength and vigour, and have enabled him to pursue his eminently useful career in this country for some time longer.

The Council cannot permit Dr. Oldham to leave them without an expression of their grateful recognition of his unceasing exertions to forward the interests and promote the welfare of the Society throughout the 25 years of his Membership during which time he has been a Member of the Council for 14 years and four times President.

The Council have at least the one source of gratification that Dr. Oldham has remained with them long enough to see the accomplishment of one of the objects for which he has striven on behalf of the Society so long and so earnestly, and by which the financial condition of the Society is placed upon a permanently sound and prosperous basis and its power of usefulness vastly increased.

The Council trust that the change of climate Dr. Oldham is now compelled to seek will prove thoroughly beneficial and that, though from a distance, they may still have for many years to come the benefit of the counsels and assistance they have learned to appreciate so fully.

Colonel THULLIER said, in recording these sentiments Dr. Oldham's old colleagues of the Council had only performed a grateful duty, which it was believed would meet with the most hearty response from the Society, on behalf of which he most cordially and sincerely bid Dr. Oldham farewell with every good wish for renewed health and continued usefulness and prosperity in his native country.

The motion of the Chairman that the resolution of the Council be accepted and confirmed by the Society was carried unanimously.

DR. DAVID B. SMITH said—*Mr. President*, when I came here this evening I had no intention of speaking; I find myself, however, strongly impelled to make a few remarks with reference to Dr. Oldham's retirement from India and from this Society. You have, Sir, this evening laid before us a Resolution of the Council of the Society, conveying an appropriate and graceful tribute to Dr. Oldham, yet I hope it may not be considered presumptuous in me to say that I think the Society would do itself honor by going a step further, so as to have a lasting Memorial of Dr. Oldham, in this room where we are now assembled. Nearly a quarter of a century ago, when I was a student of Medicine, and a pupil of that great Naturalist EDWARD FORBES (whose writings and memory are still valued and cherished by men of Science), I well remember his often alluding, in his Lectures, to Dr. Oldham as one of the then foremost leaders of Geological Science. A quarter of a century has, I am sure you will allow, not detracted from his fame in this respect; but I regret that I am altogether unable to dilate on this view of his character; indeed I am ashamed to think how meagrely I must at present allude to it. For a good many years I have been a Member of this Society and during some of these years I have had the honor of acting on the Council. I feel sure that any one who has had the opportunities that I have had of judging of Dr. Oldham's good services to this Society must place a high value on them. A good man of business, careful, exact, regardless of too adverse criticism or of party spirit, he has, as its often re-elected President, ever had the interests of this Society closely at heart; and I think that all of us who can appreciate his attainments, and who have observed his earnest interest in all Science, and his devotion to the good of this Society, must have felt that in him we have had a really strong and safe man at the wheel. I for one, Sir, should be very sorry to think that such a man should be allowed to pass away from our midst, without some permanent Memorial of him being in the possession of this Society. Whilst therefore I now speak un-preparedly and in a manner quite unworthy of my subject, I beg very strongly to suggest that it would well become the Asiatic Society of Bengal to have, in this room, some Memorial of Dr. Oldham; and I hope that the Council, on behalf of the Society, may be pleased to take the initiative, so that we may, ere long, have a picture or a bust of the distinguished man who (I much regret to think) is amongst us this evening for the last time.

The CHAIRMAN remarked that the proposals of the last speaker were most congenial to his own feelings, and he should hail with the utmost satisfaction any movement which would tend to give the Society a fitting Memorial of the late President who had done so much for the Society. As it

appeared to be the wish of the meeting that such a course should be pursued, he felt sure that the Council would take the necessary steps for raising by subscription among the members of the Society, a sufficient sum for a bust or portrait of Dr. Oldham to perpetuate his memory in the Society.

The vacancy thus caused, had had the anxious consideration of the Council, and as it was found difficult to find a suitable successor to Dr. Oldham, from amongst gentlemen, who were altogether permanent residents in Calcutta, it had been determined to elect as President for the current year, the Hon'ble E. C. Bayley, C. S. I., who had kindly consented to act and to watch over the interests of the Society, although he of necessity must be absent from Calcutta for several months.

The Council reported that in consequence of the approaching departure from India of Dr. Oldham, Colonel J. E. Gastrell, Messrs. L. Schwendler, E. Gay, and C. H. Tawney, they had nominated Col. J. F. Tennant, R. E., Dr. D. B. Smith, Messrs. H. B. Medlicott, T. S. Isaac, and W. T. Blanford as Members of the Council. Also they had appointed Mr. H. B. Medlicott, Treasurer of the Society, and Dr. T. R. Lewis as a Trustee of the Indian Museum on behalf of the Society in place of Col. J. E. Gastrell.

The CHAIRMAN said that it was a great matter of regret that the Society was losing this year so many of its valued working members in consequence of their departure from India. To Colonel Gastrell, who was on the point of departure, and to Dr. Partridge who had already gone, the thanks of the Society were eminently due for very long and most important services rendered as Office-bearers. Colonel Gastrell, whose period of Government service had expired, had been a member of Council for 11 years out of the 17 years of his membership, and during 8 of these 11 years he had acted as Treasurer of the Society, a most responsible office, and it would be difficult to find a successor on the Council who would devote himself more closely to the interests of the Society. Dr. Partridge also had been a valued member of the Council during 10 years of his membership, and had attended the meetings whenever the requirements of his professional duties would permit. Both these gentlemen, the Chairman was sure, left India with the best wishes and thanks of the Society, and he would therefore propose that the thanks of the Society should be tendered to Col. Gastrell and Dr. Partridge for their long and valuable services to the Society.

The motion was carried unanimously.

The CHAIRMAN then informed the meeting that the negotiations with the Government of India on the subject of the future accommodation of the Society, had been actively pursued and completed since the last meeting, when a summary of the proposals of the Government was laid before the Society

by their late President. The Government had paid the sum of Rs. 1,50,000 as compensation to the Society for the abandonment of their claim to the accommodation in the New Museum Building, which was provided under Act XVII of 1866, and the Society would therefore continue to occupy their old premises. A formal Deed of Release had been drawn up by the Government Law Officers and had been signed on behalf of the Society by the whole of the Members of the Council present in Calcutta, in their collective capacity. A new Bill had also been drawn up and brought before the Legislative Council to meet the altered circumstances of the case. The Chairman thought the meeting would agree with him, in deeming these arrangements altogether satisfactory, and conducive to the real interests of the Society. The money had been invested to the best advantage in $5\frac{1}{2}$ per cent. Government Securities,* and would form a capital yielding an income which would ensure the future prosperity of the Society and greatly facilitate the successful management and working of its affairs.

The Meeting were doubtless aware that the removal of the collections, and the long use the Trustees of the Museum had made of the present premises, had left the Society's property in a very deteriorated state, and

* Particulars of Government Securities purchased by the Asiatic Society of Bengal, deposited for safe custody in the Bank of Bengal, April 3rd, 1876.

Register No.	Description.		Amount.
8268	$5\frac{1}{2}$ Per Ct No.	009505/7144 of 59/60	Rs. 500 0 0
8269	" "	003890/002922 of "	10,000 0 0
8270	" "	/4523 of "	800 0 0
8271	" "	007300/6078 of "	3,500 0 0
8272	" "	043655 of "	10,000 0 0
8273	" "	043654 of "	10,000 0 0
8274	" "	013653 of "	10,000 0 0
8275	" "	043652 of "	10,000 0 0
8276	" "	043651 of "	10,000 0 0
8277	" "	043882/043538 of "	1,000 0 0
8278	" "	043881/043537 of "	1,000 0 0
8279	" "	043535/042783 of "	1,000 0 0
8280	" "	043534/ " of "	1,000 0 0
8281	" "	043804/043518 of "	5,000 0 0
8282	" "	040385/007484 of "	10,000 0 0
8283	" "	040384/ " of "	10,000 0 0
8284	" "	040377/ " of "	10,000 0 0
8285	" "	040376/ " of "	10,000 0 0
8286	" "	040375 " of "	10,000 0 0
8287	" "	038223/035082 of "	10,000 0 0
8288	" "	029129/006278 of "	10,000 0 0

Total Rupees,.... 1,43,800 0 0

it would now be absolutely essential to put the entire building into a state of thorough repair, and to effect such alterations and improvements, as were obviously necessary for furtherance of the objects of the Society and the increased comfort and advantage of its Members.

To this end it would be necessary to expend some small portion of the new capital, so as to render the Society's Premises really efficient, comfortable and appropriate. A Sub-Committee had been appointed by the Council to suggest and superintend the carrying out of the required changes, and it was hoped that whatever might be determined on, would be carried out before the next cold season.

The SECRETARY then read the Deed of Release, as below, and the motion of the Chairman that the Meeting should accept and confirm the action of the Council was carried unanimously.

DEED OF RELEASE.

Dated this 30th day of March, 1876.

THE COUNCIL of the ASIATIC SOCIETY OF BENGAL.

To the SECRETARY OF STATE for INDIA IN COUNCIL.

This Indenture, made the thirtieth day of March, one thousand eight hundred and seventy six, Between THOMAS OLDHAM, LL. D., President; BĀBU RĀJENDRALĀLA MITRA LL. D., THE HONORABLE EDWARD CLIVE BAYLEY, C. S. I., C. S., and COLONEL HENRY EDWARD LANDOR THUILLIER, R. A., C. S. I., (Vice-Presidents); COLONEL JAMES EARDLEY GASTRELL, B. S. C., LOUIS SCHWENDLER, Esquire, HENRY BLOCHMANN, Esquire, M. A., CAPTAIN JAMES WATERHOUSE, B. S. C., JAMES WOOD-MASON, Esquire, TIMOTHY RICHARDS LEWIS, Esquire, M. B., JAMES O'KINEALY, Esquire, C. S., BĀBU PRANNĀTH PANDIT, WALTER KERR WALLER, Esquire, M.D., CHARLES HENRY TAWNEY, Esquire, M.A., and EDWARD GAY, Esquire, M. A., Members of the COUNCIL of the ASIATIC SOCIETY OF BENGAL of the one part, and the SECRETARY OF STATE FOR INDIA IN COUNCIL of the other part, Whereas the said Asiatic Society of Bengal is a Voluntary Society the affairs financial and otherwise of which are regulated, administered and directed by a Council selected annually by the said Society. And Whereas upon the second day of February one thousand eight hundred and seventy-six, the said Thomas Oldham, LL. D. was duly elected President of the said Society and Bābu Rājendralāla Mitra, LL. D., The Honorable Edward Olive Bayley, C. S., C. S. I., and Colonel Henry Edward Landor Thuillier, B. A., C. S. I., Vice-Presidents, and Colonel James Eardley Gastrell, B. S. C., Louis Schwendler, Esquire, Henry Blochmann, Esquire, M. A., Captain James Waterhouse, B. S. C., James Wood-Mason, Esquire, Timothy Richards Lewis, Esquire, M. B., James O'Kinealy, Esquire, C. S., Bābu Prannāth

Pandit, Walter Kerr Waller, Esquire, M. D., Charles Henry Tawney, Esquire, M. A., and Edward Gay, Esquire, M. A., Council. And Whereas by Act XVII. of 1866, passed by the Governor General of India in Council it was amongst other things enacted that the Governor General in Council should cause to be erected at the expense of the Government of India a suitable building in Calcutta to be devoted in part to collections illustrative of Indian Archæology and of the several branches of Natural History, in part to the preservation and exhibition of other objects of interest, whether historical, physical, or economical, in part to the records and offices of the Geological Survey of India and in part to the fit accommodation of the Asiatic Society of Bengal, and to the reception of their Library, Manuscripts, Maps, Coins, Busts, Pictures, Engravings, and other property. And it was also enacted that the said Trustees should have the exclusive possession, occupation, and control for the purposes of such trusts of the said building, other than those portions thereof which upon its completion should be set apart by the said Trustees for the records and offices of the said Geological Survey and for the accommodation of the said Asiatic Society and the reception of their Library, Manuscripts, Maps, Coins, Busts, Pictures, Engravings, and other property; *And* it was also enacted that the Council of the said Asiatic Society should cause the collections belonging to such Society, and illustrative of Indian Archæology and the several branches of Natural History, and all additions that might be made thereto, to be removed to and deposited in the said building at the expense of the Government of India as soon as the same should be completed as far to be in condition to receive the said collections, and that the said Society should continue to have the same exclusive right, property in, and control over their Library, Manuscripts, Maps, Coins, Busts, Pictures, and Engravings which they then possessed, and that the Council of the said Society should have the exclusive possession, occupation, and control for the purposes of the said Society of those portions of the said building which should be set apart for the accommodation of the said Society and the reception of their Library and other property thereinbefore mentioned. *And whereas* in consideration of a sum of Rupees one hundred and fifty thousand to be paid to them by the Government of India the Council of the said Society has agreed on behalf of the said Society to relinquish and give up all right to the possession, occupation, and control secured to them by the said Act of the portions of the said building which under the said Act were to be set apart for the accommodation of the said Society and the reception of their said Library and other property. *Now this Indenture witnesseth* that in pursuance of the said Agreement and in consideration of the sum of Rupees one hundred and fifty thousand at or before the execution of these presents paid by the Secretary of State for India in Council to the parties

hereto of the first part (the receipt whereof they hereby acknowledge). They the said parties hereto of the first part for themselves and for the said Society do hereby release and for ever discharge the said Secretary of State for India in Council and his successors of, from and against all right, title and interest, claims and demands which the said Society has, or may have, to the possession, occupation and control secured to them under the provisions of Act XVII of 1866 of the Governor General of India in Council, or in any other manner of and over any portion or portions of the Indian Museum situate in Chowringhee Road, which under the said Act was or were to be set apart for the accommodation of the said Society and the reception of their Library, Manuscripts, Maps, Coins, Busts, Pictures and Engravings and other property. *In witness whereof* the said parties to these presents have hereunto set and subscribed their hands and seals the day and year first above written.

Signed, Sealed and Delivered by	THOMAS OLDHAM,	(Seal)
the above-named <i>Thomas Oldham,</i>	RAJENDRALALA MITRA,	(Seal)
<i>Rajendralála Mitra, Edward Olive</i>	E. C. BAYLEY,	(Seal)
<i>Bayley, Henry Edward Landor</i>	H.E.L. THUILLIER, COL., R.A.	(Seal)
<i>Thuillier, James Eardley Gastrell,</i>	JAMES E. GASTRELL,	(Seal)
<i>Louis Schwendler, Henry Blochmann,</i>	LOUIS SCHWENDLER,	(Seal)
<i>James Waterhouse, James Wood-</i>	H. BLOCHMANN,	(Seal)
<i>Mason, James O'Kinealy, Prannath</i>	J. WATERHOUSE,	(Seal)
<i>Pandit, Walter Kerr Waller, Charles</i>	JAMES WOOD-MASON,	(Seal)
<i>Henry Twuney, and Edward Gay,</i>	J. O'KINEALY,	(Seal)
in the presence of	PRANNATH PANDIT,	(Seal)
	WALTER KERR WALLER,	(Seal)
O. J. MELITUS,	CHARLES H. TAWNEY,	(Seal)
<i>Articled Clerk to Messrs. Berners</i>	E. GAY,	(Seal)
<i>and Co., Solicitors, Calcutta.</i>		

We do hereby certify that the above paper writing is a true copy of the Original Deed of Release of which it purports to be a Copy, the same having been examined by us herewith. Dated this 1st day of April, 1876.

O. J. MELITUS,

Art. Clerk to Messrs. Berners & Co., Sol., Calcutta.

WM. D'CRUZ,

Clerk to Messrs. Berners & Co.

The CHAIRMAN announced that Dr. S. B. Partridge and Col. Gastrell had become Life Members of the Society by paying the fee of Rs. 100 under the terms of Rule 14.

The SECRETARY read extracts from letters from Dr. Day, Mr. Grote, and Dr. Dobson relating to the Stoliczka Memorial, and submitted a statement of the account up to date.

From MR. F. DAY, dated 14th January, 1876.

Dear Sir,—A meeting of the Committee of the Stoliczka Memorial Fund was held in London on Wednesday last (January 12th) when your letters of December were laid before it.

It was announced that the sculptor Mr. Geffowski was still willing to undertake the bust at the terms formerly communicated by Mr. Grote.

It was unanimously resolved to place the execution of the bust in Mr. Geffowski's hands.

Should there be sufficient funds there will be no difficulty in obtaining a pedestal of the description desired by the Calcutta Committee.

From MR. GROTE, dated January 14th.

"Day and Duka met at my rooms here yesterday and we decided on giving Geffowski the commission for Stoliczka's bust. He undertakes it for 100 guineas of which I shall have to pay him a moiety on completion of his model. Geffowski's reputation is rising daily and he has been selected over the heads of Woolner and Noble to make the Fairbairn statue for Manchester. This is a job of 850 guineas. As Day is leaving London he has asked me to do his share of the Committee's work. He insists on making no charge on the fund for his printing and other charges. I shall have to discount your bill on the Oriental Bank should Geffowski complete his model before the 25th March. This he will probably do, though his work will have to wait till Dickinson can spare the photos."

"As regards the sums collected here, your memo. enclosed in said letter makes me out to have received £96, whereas I have only realised £76, apparently nothing more will be coming in here."

"As to the pedestal, there will be no difficulty in providing one here if you can afford the expense. Lately I paid £18 for a pedestal, the freight &c., would amount to perhaps £5 more. Oldham, I should think, would suggest to you some local material which would connect his friend's name and memory with his professional labours and which would be less costly than a pedestal dispatched from this country."

From DR. G. E. DOBSON, dated 19th February.

"As I came through London I saw Mr. Dickinson who is painting Stoliczka's portrait: it is nearly finished, so nearly that he had only to paint in some accessory things when I saw it.* I was much pleased with it, and I think the subscribers will also be well pleased. The bust I did not see, the model was not completed but soon will be, I will endeavour to go to town to see it. I would suggest that Woodbury or Carbon-type somewhat *enlarged* copies of the photograph from which the painting is being made, be

* In a letter just received from Mr. Grote, dated 30th March, he says that the picture is finished and is undergoing visits of criticism from members of the Committee and other friends of Stoliczka.

made and distributed one to every subscriber if the funds will admit. If they do not admit, then I propose that those who wish for an enlarged copy of that photograph printed in permanent pigments agree together to bear the expense of having it done. About 1200 copies Woodbury-type prints could be made for £5; certainly each copy would not cost threepence to each member."

Account Statement Stoliczka Memorial Fund.

Total subscription realized in India,...	...	.. Rs.	2,746	0	0
" unrealized " ...	...	.. "	126	0	0
			<hr/>		
			Rs.	2,872	0 0
Deduct Printing Expenses,...	...	Rs.	112	15	0
" Remitted to London by draft, £150	..	1,664	11	10	1,777 10 10
			<hr/>		
Balance remaining in India,			Rs.	1,094	5 2
			<hr/>		

English value of Balance available, at 1/9d,	...	.. £	95	14	6
Total subscription in England,	...	.. "	78	0	0
Remitted to England,	...	.. "	150	0	0
			<hr/>		
			£	821	14 6
			<hr/>		

Estimated cost of Painting with frame,					
packing and freight, ...	...	£	140	0	0
Estimated cost of Bust, packing, and freight, ..	120	0	0		
Balance available for cost of Pedestal (£23),					
and permanent photographs, as suggested					
by Dr. Dobson, ...	...	61	14	6	
			<hr/>		
			£	821	14 6
			<hr/>		

The following papers were read :

1. *On the Ghalchah (Wakhi and Sariḳol) Languages.*—By R. B. SHAW, Esq., *Political Agent, late on special duty at Kāshghar.*
(Abstract.)

The author in this paper gives an account of the Ghalchah dialects, *viz.*, those spoken by the tribes living in the valleys on the head-waters of the Oxus, north of the Hindu-Kush; dialects which belong to the Persic branch of the Arian family; and traces some radical affinities between them and the Dardu dialects spoken on the south of the Hindu-Kush Range, and which belong to the Indic branch. It is argued from these affinities that Ghalchahs and Dards must at one time have lived together not far from their present

habitations and have formed part of one people who must have at that early period spoken a tongue neither distinctly Persian nor distinctly Indian, but containing in itself germs of both forms.

As a chain of dialects connects on the one side the Dards with the Hindî speakers of the Panjâb, and on the other the Ghalchahs with the Iranian populations of Central Asia and Persia, the two lines culminating and meeting at the Hindu-Kush watershed; it is suggested that perhaps they mark the tracks by which Indians and Persians migrated to their present seats; and that Ghalchahs and Dards are perhaps the direct descendants of that portion of the Indo-Persic race which remained near its early home. Also that although the dialectic tendencies which resulted in the formation of the two distinct languages, Persian and Hindi, have operated on Ghalchah and Dardu respectively, yet the mutual resemblances still subsisting between them indicate that the ancestors of the tribes speaking those dialects must have remained together till a later period than the other members of the two great branches of the Arian family, the Persic and the Indic.

2. *Description of a new Rodent from Central Asia.*—

By JAMES WOOD-MASON, ESQ.

NESOKIA SCULLYI.

Fur fine and silky; above pale fawn-coloured paling on the sides; below, on the insides of the limbs, on the throat, lips, and cheeks, whitish: the hairs of the back being very dark slaty tipped with very pale fawn, and those of the under parts much paler slaty tipped with whitish. Face brownish grey. On the back, especially on the sacral region, some hairs longer but hardly coarser than the rest represent the coarse, flattened, spindle-shaped, grooved, and projecting bristle-like ones observed in *Spalacomys* (= *Nesokia*) *Indicus* and some other species: these hairs have a dark brown or blackish ring intervening between the slaty basal and the pale fawn apical portion. One or two of the vibrissæ reach the bases of the ears, two or three of them are black to the tips, most of them are tipped with white, a fringe of short stiff silvery ones on the upper lips. Ears short, scarcely projecting beyond the fur, all but naked, being sparsely clothed with an inconspicuous lanugo. Hands and feet flesh coloured, with a scanty covering of short hairs. Tail without a single hair, shorter than the body, obscurely scaled, the scales arranged, as usual, in rings.

The Turki name for the animal is '*Mughi*.'

Length from tip of the snout to the base of tail,	. 168	millims.
Length of tail,	. 132	"
" " ears (at back),	. 12	"
Breadth " " (convex curvature),	. 11	"

Length of hand to tip of middle finger, . . .	23	millims.
" " foot " " " " toe, . . .	48	"
" " skull with incisors, . . .	48	"
Interzygomatic breadth (at posterior root of zygoma),	28	"

The first two of the above measurements were taken by Dr. Scully on the dead body of the animal and have been converted by me from English inches into millimetres.

HAB. A single male specimen was captured on June 11th, 1875, at Sanju in Kashgharia, by Dr. J. Scully, the author of a valuable contribution to our knowledge of the avifauna of Central Asia, and has since been presented by him to the Indian Museum.

This species is at once distinguished from *Nesokia Huttoni* and *Spalacomyx* (= *Nesokia*) *Indicus* of Peters* (which latter will in all probability turn out to be identical with one of the insufficiently described species of the genus) by the quality of the fur, by the totally naked condition and proportional length of the tail, by the greater length of the hands and feet, and by the greater size and breadth of the skull, mandible, and teeth.

P. S.—In *Nesokia Huttoni* the incisors are much broader and thicker in males than in females.

8. *The Prologue to the Rámáyana of Tulsi Dás*.—By F. S. GROWSE, M. A., B. C. S.

(Abstract.)

The author states in the preface that the Rám-charit-mánas, commonly called the Rámáyana, of Tulsi Dás of Soron, was commenced in 1575 A. D. at Ayodhyá (Awadh). The work is not a Hindí translation of the ancient Sanskrit Rámáyana. The general plan and the management of the incidents are necessarily much the same, but there is a difference in the touch in every detail; and the two poems vary as widely as any two dramas on the same mythological subject by two different Greek tragedians.

The Prologue, of which Mr. Growse has given a translation, consists of 54 dohás, and is a valuable resumé of popular Hindu theology and metaphysics. Tulsi Dás's vindication of himself against his critics is a curious feature. They attacked him for lowering the dignity of the subject by clothing it in the vulgar vernacular; but though his defence did not please the professional Sanskrit Papdits, the book is in every one's hands.

The translation of the Prologue is submitted as a specimen of Mr. Growse's translation of the whole work, which is now in progress.

* 'Ueber einige merkwürdige Nagethiere des Königl. Zoologischen Museums', Abhandl. der Königl. Akad. der Wissensch., Berlin, 1860, p. 139 et seqq.

Mr. Blochmann read several portions of Mr. Growse's paper. He said that the Prologue commenced, as usual, with an invocation of the Goddess of Speech, to which he might compare the custom of Muhammadan Maḡnawī writers to add to the preface of epics a chapter on the *ta'rif i suḡhan*, which custom had become *de rigueur* since the time of Nizāmī. He was much struck with Mr. Growse's translation of the 17th doḡá: it reminded him of the Bhagawat Gītā controversy, and was an additional proof that religious thought repeats itself, and that it was not difficult to cull passages from Hindu works that bear the most striking similarity to passages of the New Testament, though the authors could not be supposed to have been acquainted with Jewish or Christian writings. The passage he referred to was the following:

There is one God, passionless, formless, uncreated, the universal soul, the supreme spirit, the all-pervading, whose shadow is the world; who has become incarnate and done many things, only for the love that he bears to his faithful people, &c., &c.

He hoped that Mr. Growse would have leisure and strength to complete the great—he might say, national—work which he had commenced. Mr. Growse was well known both for the extent of his researches in Hindī folklore and philology, and for the classical taste that pervades his translations; and there was no one better qualified to bring out a faithful and truly readable version of Tulsi Dās's Rāmāyana than Mr. Growse.

The reading of the following paper was postponed—

On Ancient Asiatic Firearms. By Major General R. Maclagan, R. E.

LIBRARY.

The following additions have been made to the Library since the meeting held in March last.

TRANSACTIONS, PROCEEDINGS AND JOURNALS.

Presented by the respective Societies or Editors.

Berlin. Königliche Preussische Akademie der Wissenschaften.—Monatsbericht, December, 1875.

Siemens.—Messung der Fortpflanzungsgeschwindigkeit, der Electricität in suspendirten Drahten.

Birmingham. Institute of Mechanical Engineers.—Proceedings, November, 1875.

W. Daniel.—On Mechanical Ventilators for Mines. *C. Cochrane*.—On the Ultimate Capacity of Blast Furnaces.

Bordeaux. Société de Géographie Commerciale de Bordeaux.—Bulletin, No. I, 1874-75.

Boston. Society of Natural History.—Memoirs Vol. II, Pt. III, Nos. 4, 5, and Pt. IV, No. 1.

Pt. IV, No. 1. *C. R. O. Sacken*.—Prodrome of a Monograph of the *Tunbanidae* of the United States.

———. Proceedings, Vol. XVI, Pts. 3 and 4, Vol. XVII, Pts. 1 and 2.

Vol. XVI, Pt. 3. *L. F. Fourtales*.—Remarks on Crinoids. *J. A. Allen*.—Metamorphism produced by the burning of Lignite Beds. *T. M. Brewer*.—Hybridism among the Ducks. *T. S. Hunt*.—Deposition of Clays.

Pt. 4. *S. Kneeland, M. D.*—Evidence for and against the existence of the so called Sea-serpent. *Samuel Wells*.—A simple Heliostat.

Vol. XVII, Pt. 1. *A. Hyatt*.—Genetic Relations of the *Angulatis*. *J. G. Hunt, M. D.*—Contents of Mastodon's Stomach.

Pt. 2. *J. D. Dana*.—Metamorphism and Pseudomorphism. *A. Hyatt*.—Hollow-fibred Horny Sponges. *F. W. Putman*.—Mammoth Cave Fishes. *A. Hyatt*.—Two new Genera of Ammonites. Biological Relations of Jurassic Ammonites. *R. Rathbun*.—Cretaceous Lamellibranchs from near Pernambuco, Brasil.

Bombay. The Indian Antiquary, Vol. V, Pt. 58.

J. W. M'Crindle.—Translation of the Indica of Arrian, (Continued). *Dr. G. Bühler*.—Inscriptions from Kāvi. *Dr. F. Kuhlhorn*.—The Nitimanjari of Dyā Dviveda.

Calcutta. The Christian Spectator, Vol. V, No. 58, April 1876.

———. The Ramayanam, Pt. 5, No. 5.

———. Geological Survey of India.—Records, Vol. IX, Pt. 1, 1876.

Annual Report of the Geological Survey of India, and of the Geological Museum, Calcutta, for the year 1875. *W. T. Blanford*.—On the Geology of Sind.

Leipsic. Kunde des Morgenlandes. Abhandlungen, Band. V, No. 4.

Zur Sprache, Literatur, und Dogmatik der Samaritaner.

London. Chemical Society,—Journal, Ser. 2, Vol. XIII, November and December, 1875, Ser. 2, Vol. XIV, January, 1876.

Vol. XIII, Nov. *A. W. Hofmann*.—The Faraday Lecture: The Life-work of Liebig in Experimental and Philosophic Chemistry; with Allusions to his influence on the Development of the Collateral Sciences and of the Useful Arts.

December. *J. C. Brown*.—On the Agricultural Chemistry of the Tea Plantations of India.

———. The Geographical Magazine, Vol. III, No. 3, March, 1876.

E. G. Ravenstein.—Cameron's Route from Lake Tanganyika to the west coast of Africa. *C. E. Markham*.—The Irrigation of Firospur. *D. Kerr*.—The World's future Coal Depot.

———. Nature,—Vol. 13. Nos. 328 to 332.

———. Royal Astronomical Society,—Monthly Notices, Vol. 36, No. 3.

On a new form of Solar Eyepiece by Mr. Christie.

———. Royal Geographical Society.—Proceedings, Vol. XX, No. 1.

———. Royal Society,—Proceedings, Vol. XXIV, No. 165.

E. von Willmann-Suhm, Ph. D.—On the development of *Lepus fascicularis* and the *Archipeden* of Cirripedia.—Preliminary Remarks on the development of some Pelagic Decapoda.

London. Statistical Society.—Journal, Vol. XXXVIII, Pt. 4, 1875.

Moscow. Société Impériale des Naturalistes de Moscou.—Bulletin No. 2, 1875.

B. Hermann.—Untersuchungen über die specifischen Gewichte fester Stoffe.

A. Becker.—Reise nach dem Magi Dag, Schalbus Dag und Basardjuni. *V.*

Moischoulsky.—Énumération des nouvelles espèces de Coléoptères rapportées de ses voyages.

Palermo. Società degli Spettroscopisti Italiani.—Memorie, Dispensa, 12, Dicembre, 1875, and Dispensa, I, Gennaio, 1876.

Dispensa 12, 1875. *P. A. Secchi.*—Recenti ricerche intorno alla distribuzione del calore sul disco Solare. Il nuovo Osservatorio di Calcutta. Bordi solari osservati da A. Secchi e P. Tacchini nel giugno e luglio, 1874. *J. A. C. Oudemans.*—Sur une meilleure méthode pour faire les mesures héliométriques a l'occasion d'un passage de Vénus sur le soleil.

Dispensa 1, 1876. *P. Tacchini.*—Statistica delle eruzioni solari osservate a Palermo nel 1871.—Osservazioni Spettroscopiche del sole fatte nel 1875 dal prof. *Bradichin*, direttore della Specola di Mosca.—Notizie di Calcutta.

Paris. Société de Géographie.—Bulletin, Février, 1876.

l'Abbé Armand David.—Second voyage d'exploration dans l'ouest de la Chine 1868, à 1870, (suite).

Pisa. Società Toscana di Scienze Naturali.—Atti, Vol. II, fasc. I.

Trieste. Società Adriatica di Scienze Naturali.—Bollettino, Nro. 7, Dicembre, 1875.

Dr. B. Biasoletto.—L'acido rosolico come indicatore della quantità di acido carbonico nell'aria. *Dr. Stenta.*—Notizie riguardanti i bacini del Caspio e dell'Aral.

BOOKS AND PAMPHLETS

Presented by the Authors.

ATKINSON, EDWIN T. Economic Products of the North-Western Provinces, Pt. I.—Gums and Gum-Resins.

BRAHMADEBATA SÁMADHYATI. Samaveda Sanhita Kauthumi Sákha, Vol. I, Pts. 1 to 3.—Srimadbághavatam, with Commentary. Sridharasvámi, Pts. 1 to 3, and 5 to 8.

PICKERING, CHARLES, M. D. Chronological Observations on Introduced Animals and Plants, Pt. I.

TREBOLD, W. Descriptive Catalogue of the Reptiles of British India.

MISCELLANEOUS PRESENTATIONS.

Report on the Food-grain Supply and Statistical Review of the Relief Operations in the Distressed Districts of Behar and Bengal during the Famine of 1873-74.

Report on the Financial Results of the Excise Administration in the Lower Provinces for the year 1874-75.

Report on the Land Revenue Administration of the Lower Provinces for the year 1874-75.

GOVERNMENT OF BENGAL.

General Report on the Revenue Survey Operations of the Upper and Lower Circles for 1874-75, by Colonel J. E. Gastrell and Lieut.-Col. J. Macdonald.

SUPERINTENDENT REVENUE SURVEY.

Synopsis of the Results of the Operations of the Great Trigonometrical Survey of India, Vol. VI, (duplicate), by Col. J. T. Walker, R. E.

REVENUE DEPT. GOVT. OF INDIA.

Report on the Judicial Administration (Criminal) of the Central Provinces for 1875.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Tagore Law Lectures, 1874-75. The Law relating to the Land Tenures of Lower Bengal. By A. Phillips, M. A.

REGISTRAR, CALCUTTA UNIVERSITY.

Fifty-sixth Annual Report of the Board of Public Education for the year 1874.

Annual Report of the Board of Regents of the Smithsonian Institution for 1873.

Contributions to the Annals of Medical Progress and Medical Education in the United States before and during the War of Independence, by Joseph, M. Toner, M. D.

Report on the Chemistry of the Earth. By T. S. Hunt, LL. D. (4 copies).

Memoir of C. T. P. von Martius. By Charles Rau, (4 copies).

SMITHSONIAN INSTITUTE.

Monthly Reports of the Department of Agriculture for 1874.

DEPT. OF AGRICULTURE OF THE U. S. AMERICA.

Purchas his Pilgrimage or Relations of the World, and the Religions observed in all ages and places discovered from the Creation unto this present, 1614.

E. GAY, Esq.

Ithâf-ulnubalâ il-muttaqîn bi-ihyâi maâsir ilfuqahâ ilmuhaddisîn. Albittâ fi zikr ilqihâh il-Sittah. Tâj uliqbâl Târikh i riyâsat i Bhopâl (Persian). ditto ditto (Urdû). Luqat ul'ajalân. Rihlat uqçidîq ila-lbait il'atîq. Qitf ul-samar. Alintiçâd ulrajih fi sharh il-i'tiqâd ilçahîh. Huçûl ul mâmûl 'ilm il-uçûl. Iksîr fi uçûl iltafîr.

NAWÂB SAYYID SIDDÎQ HASAN KHÂN BAHÂDUR, OF BHOPÂL.

PERIODICALS PURCHASED.

Berlin. Journal für die reine und angewandte Mathematik, Band 82, Heft II.

L. Fuchs.—Ueber die linearen Differentialgleichungen zweiter Ordnung welche algebraische Integrale besitzen, und eine neue Anwendung der Invariantentheorie. *T. Caspary*.—Die Krümmungsmittelpunktsfläche des elliptischen Paraboloids.

Bombay. Bombay Branch of the Royal Asiatic Society,—Vol. XI, No. 32, 1875.

Dr. J. G. Buhler.—Additional Remarks on the Age of the Nuishadiya. *J. G. Da Cunha*.—An Historical and Archaeological Sketch of the Island of Angediva. *Hon. Rao-Sahab V. N. Mandlik*.—Three Walabhi Copper Plates with Remarks.

Calcutta. Calcutta Review,—No. 124, April, 1876.

———. The Indian Medical Gazette,—Vol. XI, No. 4.

———. Stray Feathers,—Vol. IV, Nos. I, II, and III.

J. Scully.—A Contribution to the Ornithology of Eastern Turkestan. *C. T. Bingham*.—*Anastomus Oucitans*.

Göttingen. Göttingische gelehrte Anzeigen, Nos. 3, 4. Nachrichten. No. 25 and No. 1, 1876.

No. 1, *Noldike*.—Karkemisch, Ciresium, und andre Euphrat-Uebergänge.

London. The Academy,—Nos. 198 to 202, 1876.

———. Annals and Magazine of Natural History,—Vol. 17, No. 98.

Prof. Allman.—Descriptions of some new Species of *Hydroids* from Kerguelen's Island. *J. Wood-Mason*.—A Conspectus of the Species of *Paratelphusa*, an Indo-Malayan Genus of Freshwater Crabs. *M. E. Bugnion*.—On the Vermineous Pneumonia of Domestic Animals. *M. P. Carbonnier*.—Nidification of the Indian Rainbow Fish. *M. O. Grunm*.—On the Scientific Exploration of the Caspian Sea. Formation of Nitrites by *Bacteria*.

———. Conchologia Indica,—Pts. 7 and 8.

No. 7. *Diplommatina*. *Paludomus*. *Helix*. *Megalomastoma*. *Raphaulus*. *Stroptaulus*. *Helicina*. *Glostophis*. *Pterocyclos*, including *Spiraculum*, &c. *Craspedotropis*. *Jerdonia*. *Lagochelilus*. *Cyathopoma*. *Mychopoma* and *Ditropis*. *Navicella*. *Corbicula*. *Leptopoma*. *Pterocyclos*.

No. 8. *Cyclophorus*. *Alyceus*. *Omphalotropis*. *Cataulus*. *Cyathopoma*. *Cromuconchus*. *Sophina*. *Hypselostoma*. *Bulimus*. *Helix*. *Planorbis*. *Amnicola*. *Bitunia*. *Vitrina*. *Melania*. *Unio*. *Corbicula*. *Cycas*. *Pisidium*. *Tricula*. *Achatina*. *Coelostele*. *Pupa*. *Stroptaxis*. *Navicella*. *Neritina*. *Camptoceras*. *Limnaea*. *Succinea*. *Helix*. *Clausilia*.

———. The Edinburgh Review,—No. 291, January, 1876.

The Suez Canal.

———. The Ibis, 3rd Series, Vol. V, No. 20, October 1875 and Vol. VI, No. 21, January 1876.

Vol. V, No. 20. *W. V. Legge*.—On the Birds of the South-Eastern Subdivision of Southern Ceylon. *R. Swinhoe*.—On the contents of a second Box of

Birds from Hakodadi, in Northern Japan. *Arthur, Viscount Walden*.—Notes on Birds from Burma. *Dr. N. Severtzoff*.—Notes on some new Central Asiatic Birds.

Vol. VI. No. 21. *E. Bowdler Sharpe*.—Contributions to the Ornithology of Borneo. *H. E. Dresser*.—Notes on Severtzoff's "Fauna of Turkistan."

London. The London, Edinburgh and Dublin Philosophical Magazine, 5th Series, Vol. I, No. 2.

E. Edlund.—Experimental Proof that the Resistance to Galvanic Conduction is dependent on the Motion of the Conductor.

———. The Quarterly Review, No. 281, January 1876.

Modern Methods in Navigation and Nautical Astronomy.

———. Society of Arts,—Journal, Vol. 24, 1209 to 1212.

New Haven, U. S. The American Journal of Science and Arts, Vol. X, No. 60, Vol. XI, No. 61.

No. 60. *S. P. Langley*.—The Solar Atmosphere; an introduction to an account of researches made at the Allegheny Observatory. *P. H. Storer*.—Ammonia a constant contaminant of Sulphuric Acid.

No. 61. *E. Loomis*.—Contributions to Meteorology. *H. A. Rowland*.—Studies on Magnetic Distribution.

Paris. Annales de Chimie et de Physique, 5me Série, Vols. IV, V, VI.

Vol. V. *MM. P. Champion, H. Pellat, et M. Grenier*.—Application de l'électricité à l'inflammation des fourneaux de mine, torpilles &c., et à l'industrie minière. *M. Boussingault*.—Etudes sur la transformation du fer en acier par la cémentation. *M. H. Muntz*.—Sur les ferments chimiques et physiologiques. *M. C. Dr. Jeannel*.—Note relative à l'influence des racines des végétaux vivants sur la putréfaction.

———. Comptes Rendus, Tome 82, Nos. 1 to 4, 1876.

No. 1. *M. J. Jamn*.—Sur la constitution intérieure des aimants. *M. Th. du Moncel*.—Scizième Note sur la conductibilité électrique des corps médiocrement conducteurs. *M. A. Croca*.—Recherches sur la loi de transmission par l'atmosphère terrestre des radiations calorifiques du Soleil.

No. 2. *M. J. M. Gauguain*.—Influence de la trempo sur l'aimantation. *M. Gaumet*.—Sur un télémètre de poche à double réflexion.

No. 3. *M. A. Muntz*.—Transformations du sucre de canne dans les sucres bruts et dans la canne à sucre. *MM. Aimé Girard et Labord*.—Sur l'inactivité optique du sucre réducteur contenu dans les produits commerciaux.

Paris. Journal des Savants, December, 1875.

———. Mélanges d'Archéologie Egyptienne et Assyrienne, Tome II, 8^e Fas.

———. Revue Archéologique, Janvier, 1876.

———. Revue Critique d'Histoire et de Littérature.—Nos. 1 to 5, 1876.

No. 1. *Cowell*.—Introduction au Prâkît des drames.

No. 5. *Childers*.—Dictionnaire de la langue Pâli.

———. Revue des Deux Mondes, Tome 13, Pts. 2 and 3.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR MAY, 1876.

The Monthly General Meeting of the Society was held on Wednesday the 3rd May, at 9 o'clock, P. M.

W. T. Blanford, Esq., Vice-President, in the Chair.

The minutes of the last Meeting were read and confirmed.

The following presentations were announced—

1. From the Government of India, Home Department, a set of photographs of the paintings at the Adjanta Caves in the Bombay Presidency.

2. From the author, a copy of a work entitled—"The Travels of Guru Tegh Bahadur and Guru Gobind Sing. Translated from the original Gurumukki by Sirdar Attar Sing, Chief of Bhadaur.

3. From the author, a pamphlet entitled—"What is the correct term for God in Santhali?" By the Rev. L. O. Skrefsrud.

4. From the Manager, Basel Mission Book and Tract Depository Mangalore, a pamphlet entitled—"Ueber den Ursprung des Lingakultus". By F. Kittel.

5. From Dr. J. Scully, a copy of his paper entitled—"A Contribution to the Ornithology of Eastern Turkestan."

The following gentlemen, duly proposed and seconded at the last Meeting, were elected ordinary members—

Surgeon-Major A. F. Bradshaw, J. M. Lyall, Esq., A. M. Nash, Esq.

The following are candidates for ballot at the next meeting.—

Julius Behrendt, Esq., Professor, Dacca College, Dacca, proposed by Mr. H. Blochmann, seconded by Captain Waterhouse.

J. F. Baness, Esq., Chief Draftsman, Surveyor General's Office, proposed by Capt. Waterhouse, seconded by Mr. Blochmann.

B. Parry, Esq., Professor, Presidency College, Calcutta, proposed by Mr. Blochmann, seconded by Capt. J. Waterhouse.

The following coins were exhibited at the meeting by Mr. Blochmann.

(1) From Dr. J. Scully, 2 gold coins, 3 silver coins, 3 copper coins, from Káshghar, and six pierced Chinese copper and brass coins, one of them large, about $1\frac{1}{2}$ inch in diameter.

Dr. Scully writes—'The gold coins are called *tilla* [طلا *tilá*, gold]; the Káshghar one is worth about Rs. 5, and the Khoqand *tilla* about Rs. 6-8-0.

'The small Káshghar silver coins are called 'tanga', and 25 of these equal in value one *tilla*; 5 tangas = 1 Rupee.

'The large copper coin (Chinese) is not now in circulation in Eastern Turkistán; it was said to equal four of the small Chinese copper coins.

'The pierced Chinese copper coins are called 'Dachin'; 25 of them = 1 tanga. They are the commonest kind of coin met with in Káshgharia. The brass coins are also called 'Dachin', but are not now in circulation. The small Muhammadan copper coins are new 'Dachin', intended to supersede the old Chinese pattern.'

Mr. BLOCHMANN said—

The Muhammadan gold, silver, and copper coins, presented by Dr. Scully, have the following legends:

The Khoqand Tila—بہادر خان سید سلطان محمد

Bahádur Khán Suyyid Sultán Muhammad.

ضرب دار السلطنة خوقند لطیف ۱۲۸۰

Struck at the capital Khoqand, the pleasant.

The Káshghar Tila—سلطان عبد العزیز خان ۱۲۹۱

Sultán 'Abdul 'Azíz Khán, A. H. 1291.

ضرب دار السلطنة كاشغر ۱۲۹۱

Struck at the capital Káshghar, A. H. 1291.

In both *tilás*, the legends are circular, and the margins have little crosses, dots, and arabesques.

The Káshghar Tanga. عبد العزیز خان

'Abdul 'Azíz Khán.

ضرب كاشغر لطیف ۱۲۹۱

Struck at Káshghar, the pleasant, A. H. 1291.

The new Káshghar Dachins. They have the same legend as the tanga; but Káshghár has not the epithet of *latíf*, 'the pleasant'. The epithet is common on all Khoqand coins.

The name of 'Abdul 'Azíz Khán, Sultán of Turkey, is given on the coins, because the present Atáliq of Káshghar does not feel strong enough to strike coins in his own name.

There is also a modern Persian silver piece among Dr. Scully's coins, which bears the legend—

السلطان ناصر الدين شاه قاجار

Sultān Nāṣir-uddīn Shāh, the Kājār.

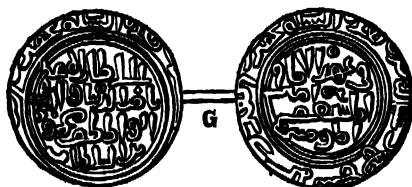
ضرب مشهد مقدس ۱۲۷۰

Struck at Mashhad, the holy, A. H. 1270.

(2.) From the Rev. M. Carleton, American Mission, Karnāl, for exhibition, a unique gold coin of Nāṣir-uddīn Mahmūd Shāh (A. H. 644 to 664; A. D. 1246 to 1265).

Mr. BLOCHMANN said—Mr. Thomas has remarked that the earlier kings of Dihlī do not seem to have issued many gold coins; but no gold coin struck by Mahmūd Shāh appears to exist in the best coin cabinets.

Mr. Carleton's coin has the same legend as the silver Mahmūd Shāhī in Thomas's chronicles, pl. II, 39, and p. 129.



The weight is 168·45 grains. Both obverse and reverse have the same legend.

OBVERSE—السلطان الاعظم ناصر الدنيا و الدين ابو المظفر محمود بن السلطان

REVERSE—في عهد الامام المستعصم امير المؤمنين

MARGIN (on both faces)—ضرب هذه السكة بمضرت دهلي في سنة سبع وخمسين وستمائة

The great Sultān Nāṣir uddunyā waddīn Abul Muzaffar Mahmūd, the son of the Sultān,

In the time of the Imām Al-Musta'qim, the Commander of the Faithful.

This coin (*sikka*) was struck in the capital, Dihlī, in 657 A.H.

(3) The Society has also bought of Bābu Omesh Chunder Banerjee, Godda, a gold coin, struck by Muhammad-bin-Tughluq in the name of the Egyptian Khalif Al-Mustakfī Billah, Dihlī, 743, A. H. The coin weighs 168·05 grains.

The coin has been described by Mr. Thomas in *Chronicles*, p. 259.* Another specimen of the same year is in the cabinet of General Cunningham.

* Where the word *في* is left out before *دهلي*.

Mr. BLOCHMANN exhibited a further batch of Muhammadan Inscriptions.

(1) From Mr. Delmerick's Dillí rubbings, three inscriptions of A.H. 1012, 1068, 1068, of the reigns of Akbar, Sháhjahán and Aurangzib. The first is taken from the tomb of Mirzá Muzaffar.

* (2) From Mr. Delmerick's Hicár Firúzah rubbings, four inscriptions, dated 992, 927, 931, 944, H.

(3) From Mr. F. L. Beaufort, C. S., a reading and translation of the inscription of a large cannon in the Jinsí-Topkhánah, Murshidábád. The gun was cast at Dháká in A. H. 1047, or A. D. 1632.

The text and translations of these inscriptions will be published next month.

Mr. WOOD-MASON read the following extract from a letter from Mr. S. E. Peal of Sibsagar, Assam,

"While out with an Assamese lately in the jungles, whistling for deer we came on a place all *swamp* and dug up by *Pigs* looking for *fish*."

"Did you know this as a custom? it seems (on enquiry) quite correct. Jackals also are destroying all the sugar-cane plantations about here. I am pestered for loan of guns or powder to shoot them. This is so bad *west, i. e.*, Golaghat and Gauhati, that high fences have to be made to save the canes," and stated that the wild pigs of the Andaman Island repaired daily at low water to the sea-shore in search of crustacea, fish, and other animals.

Mr. W. T. BLANFORD said that the carnivorous habits of wild pigs were well known. Mr. Peal has given us no details in this case, but he has doubtless satisfied himself that the ground he mentions was turned up by pigs in search of fish, and not of roots. The margins of tanks and of marshes are always found more or less dug up wherever wild pigs occur, but this is usually done in order to enable the animals to feed on the roots of water plants.

Jackals are largely frugivorous, and often feed entirely on the fruit of the ber (*Zizyphus*) and their partiality for sugarcane has been noticed before. In fact many animals are far less exclusively herbivorous or carnivorous in their habits than is generally supposed.

The Council reported that they had elected Mr. W. T. Blanford, a Vice-President of the Society in the place of the Hon'ble E. C. Bayley, C. S. I., who had been appointed President.

The CHAIRMAN announced that the Council had sanctioned the purchase of a selection from the Coins belonging to the late Colonel Guthrie, to the amount of Rs. 2000-0-0.

The CHAIRMAN also announced to the meeting that steps would be taken immediately for the thorough repair of the Society's premises. Some inconvenience would no doubt be felt, while the repairs were going on, but it was hoped that it would not be found necessary to interfere with the usual course of the meetings, or with the other business of the Society.

The following papers were read :

- 1.—*On Early Asiatic Fire Weapons.*—By Major-General R. MACLAGAN, R. E., Secretary to the Government of the Panjáb, P. W. D.

(Abstract.)

The introduction of this paper treats of the various kind of fire arrows used by the Greeks and the Romans. The author then collects numerous passages from the historians of Asia and Africa regarding the use of petroleum and naphtha for purposes of war. What we call 'Greek Fire' was nothing else but petroleum, and the Arabs have left us numerous recipes for warfare and fireworks, both liquid and dry, most of which contained petroleum, or one or all constituents of gunpowder. The preparation of Greek Fire has never been a secret, nor has the art ever been lost; and only the difficulty of procuring it in Europe made its use a rare occurrence. It was extensively used by the Arabs in Sindh (690); at the sieges of Constantinople (717) and Thessalonica (904); in Egypt; by Chingiz Khán, Timur, and even in England, where it was introduced by Edward I.

The noise accompanying the discharge of war-fire, consisting of petroleum, and the use of long tubes for throwing it, has inclined many writers to refer the invention and application of gunpowder to early times; and the Chinese have specially been mentioned as having been acquainted with the use of gunpowder long before it became general in Europe. The ancient Hindus, too, are said to have been acquainted with it. General MacLagan shows that either assertion is utterly groundless. The extensive use of petroleum missiles was certainly due to the Arabs, and the introduction of gunpowder and artillery proceeded from Europe to the East.

The paper concludes with a sketch of the progress of artillery up to the end of the 16th century in India, Persia, Burmah and China.

The essay will appear in the first number of Pt. I of the Journal for 1876.

- 2.—*Were the Sundarbans inhabited in Ancient Times?*—By H. BEVERIDGE, Esq., B.C.S.

(Abstract.)

This paper contains several interesting notices on the condition of the Sundarbans in the 16th century, and an account of the journey, in November and December, 1599, of the Portuguese missionary Fonseca from Dianga (south of Ohittagong) over Baklá (Kochúá in Báqirganj) to 'Ciandecan',

the king of which received him kindly, and allowed him to build a church. The church built at Ciandecan, the author states, was the first ever erected in Bengal; that of Chittagong was the second, and then came the church at Bandel, which was erected by a Portuguese named Villalobos.*

Mr. Beveridge identifies 'Ciandecan' with Chánd Khán, or Dhúmghát, the seat of Rájá Pratápaditya, in the 24-Parganahs, near Káliganj. 'Chánd Khán' was the old name of the property in the Sundarban, which Vikramá-ditya, Pratápaditya's father, got from Dáúd Sháh of Bengal.

The description of the wood and rivers, the animals and scenery described by Fonseca, and the fact that he speaks of no towns, show that the Sundarban in 1599 was what it now is.

The paper will be printed in No. I, of Pt. I, of the Journal for 1876.

Mr. W. T. BLANTFORD said—That any contribution to the history of the Sundarbans was of interest because of its bearing upon the theories of formation of river deltas. If Mr. Ferguson's views of the mode in which the delta of the Ganges has changed in late years be accepted, it is very improbable that the Sundarbans have, at any recent period, been higher above the water level, and consequently better suited for human habitation than they are at present.

Mr. H. F. BLANTFORD said—That there was good Geological evidence of the Sundarbans having undergone depression: since excavations everywhere in and around Calcutta and also at Kulna in Jessore showed that an old forest, indicated by stumps of trees with their roots *in situ*, exists at a depth of from 20 to 30 ft.; at such a depth, that if the ground above were removed, the forest bed would be some feet below low water level. This forest is chiefly *Sundri*, a tree which now grows between tide marks, and the ground above is apparently a fresh water deposit. Nothing could be said as to the date of the submergence, whether it took place within what are usually regarded historic times or earlier.

Mr. H. BEVERLEY enquired whether it was not the case that the cultivation of the Sundarbans was largely influenced by the action of the river-system of the lower Gangetic delta. Where there was a strong current of fresh water making its way to the sea, it was only reasonable to suppose that the salt water was thereby kept back somewhat and the land rendered fit for habitation and capable of being cultivated. Now Mr. Westland had shown in his work on Jessore that for many years past the river-system of the delta had been gradually shifting eastwards, and it was the fact that at the present day the great body of the waters of the Ganges and Brahmaputra rivers emptied itself by the Megna which flowed to the east of the Báqirganj

* But the keystone of the old Bandel church, said to have belonged to the original church that was destroyed by Sháhjahán's troops, bears the year 1599. THE EDITOR.

district. It was also a fact that in that district the margin of cultivation lay nearer the sea than either in the 24-Parganahs or in Jessore. Starting from a point not many miles south of Calcutta, this margin extended almost in a straight line to within a few miles of the sea in the Bâqirganj district. Wherever there was a large river, cultivation would be found to encroach somewhat south of the line, but as a general rule its direction was as stated. When reporting on the census of 1872, Mr. BEVERLEY said, he had made special enquiries with reference to this subject, but he had failed to ascertain that in the districts of the 24-Parganahs and Jessore there had been any great increase of cultivation within recent years. At the same time if it could be shown (as indeed the numerous old river-beds found in the Hûglî, Nadiâ and Jessore districts seemed to indicate) that at some former time the main channel of the Ganges flowed through the Western Sundarbans, it was not impossible that the margin of cultivation, and consequently of population, may have lain further to the south in those parts than at present. Were we to suppose that by some change in the river-system, the Megna were now to lose half its volume of water, there could be no doubt that the salt water tides would gain a corresponding influence, and a certain quantity of land in the neighbourhood would again be thrown out of cultivation and be depopulated.

8.—*Description of a new Phasmideous Insect from the Andamans.*—

By J. WOOD-MASON, Esq.

The author describes, under the name of *L. verrucifer*, the two sexes of an insect belonging to the same little group as *Lonchodes amaurops*, *nodosus*, *brevipes*, *uniformis*, *Crawangensis*, *bifolius*, &c., all species, like it, with the first tarsal joint of the fore legs elevated into a sharp foliaceous crest; and states that *Lonchodes nematodes*, an insect with short filiform antennæ and long and simple first tarsal joint to fore legs, cannot be the male of *L. Crawangensis*, an insect with long setaceous antennæ and foliaceous first tarsal joints, but that it must be the male of *L. cunicularis*, or of some closely allied form.

This section of the genus *Lonchodes* is represented in India by one species only, the *L. brevipes*, which is said to be a native of the Malabar coast, the fauna of which was largely composed of representative Malayan forms.

Mr. W. T. BLANFORD called attention to the large field for exploration still offered by the hills of Southern India and the forests near the Malabar coast. The wonderful collections of reptiles and land mollusks made by Colonel Beddome served to shew how much in all probability remained to be learned in other branches of Zoology.

LIBRARY.

The following additions have been made to the Library since the meeting held in April last.

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Rev. J. F. Kearns.—Âtma Bôdha Prakâśika. *L. Etic.*—Two Kongu or Chera Grants of A. D. 464 and 613. *Dr. F. Kielhorn.*—Remarks on the S'ikhâs. *Dr. H. Bahler.*—Inscriptions from Kavi, No. 2. *J. Muir.*—Maxims and Sentiments from the Mahâbhârata. *J. F. Fleet.*—Sanskrit and old Canarese Inscriptions, No. XV. *Rev. G. U. Pope.*—Notes on the South-Indian or Drâviḍian family of Languages.

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J. Lister.—A Contribution to the Germ Theory of Putrefaction and other Fermentative Changes, and to the Natural History of Torulae and Bacteria.
A. Buchan.—On the Diurnal Oscillations of the Barometer.

_____. _____. **Proceedings, Session, 1874-75.**

C. G. Knott and A. Macfarlane.—On the Application of Angström's Method to the Conductivity of Wood. *J. G. MacGregor.*—Note on the Electrical Conductivity of Saline Solutions, *R. Tennent.*—'The Theory of the Causes by which Storms progress in an Easterly direction over the British Isles, and why the Barometer does not always indicate real Vertical Pressure.

Genoa. Museo Civico di Storia Naturale. *Annali*,—Vols. II, III, IV, V, VI. 1872—74.

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———. Geological Society.—Quarterly Journal, Vol. 82, Pt. 1, No. 125.

Prof. Owen.—On a new Modification of Dinosaurian Vertebrae. *H. Woodward.*—On the Discovery of a Fossil Scorpion in the British Coal-measures. On a remarkable Fossil Orthopterous Insect from the Coal-measures of Scotland.

——. *Nature*, Vol. 13, Nos. 333 and 336.

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T. E. Thorpe and *A. W. Rucker*.—On the expansion of Sea-water by Heat.
Prof. W. G. Adams.—On the Action of Light on Tellurium and Selenium.
Prof. O. Reynolds.—On the Refraction of Sound by the Atmosphere. *J. Tyndall*.
 —On the Optical Department of the Atmosphere in reference to the Phenomena
 of Putrefaction and Infection. *Capt. J. Waterhouse*.—On Reversed Photo-
 graphs of the Solar Spectrum beyond the Red, obtained on a Collodion Plate.

London. Royal Astronomical Society,—Memoirs, Vol. 42, 1873-75.

Lieut.-Col. J. F. Tennant, R. E.—Report on observations of the Total Eclipse of the Sun on December 11—12, 1871, made by order of the Govt. of India, at Dodabetta, near Ootacamund. *E. J. Stone*.—The Total Eclipse of the Sun April 16, 1874.

———. Monthly Notices, Vol. 36, No. 4.

Report of the Council to the Fifty-sixth Annual General Meeting of the Society Notes on some Points connected with the Progress of Astronomy during the past Year.

———. Royal Geographical Society,—Proceedings, Vol. XX, No. II.

Livingstone East Coast Expedition. *Lieut. Cameron's* Arrival at the West Coast of Africa. *Cameron*—Letters detailing the journey of the Livingstone East Coast Expedition from Lake Tanganyika to the West Coast of Africa.

Palermo. Società degli Spettroscopisti Italiani,—Memorie. Dispensa 2 e 3, Febbraio e Marzo, 1876.

Disp. 2. *P. Tacchini*.—Macchie e facole al bordo, Osservazioni dirette e spettroscopiche fatte all'osservatorio di Palermo nel 1874.—Magnesio al bordo osservato a Palermo nel 1874.

Disp. 3. *P. Tacchini*.—Magnesio al bordo osservato a Palermo nel 1874.—Osservazioni spettroscopiche solari fatte a Palermo nel primo trimestre 1876.—Statistiche delle eruzioni solari osservate a Palermo nel 1874.—Macchie solari osservate all'Equatoriale di Merz della specola di Palermo nel primo trimestre 1876 da *P. Tacchini*, e tempo del passaggio del semidiametro solare determinato da *G. de Lina*.

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Roorkee. Professional Papers on Indian Engineering,—2nd Series. Vol. V, No. 20.

Capt. A. Cunningham.—Continuous Uniform Beams. *J. C. Douglas*.—The Limit of Elasticity.

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Surveyor General's Department for 1874-75.

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dency during 1874-75, No. 49.

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Vol. VI.

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Survey of the Territories, embracing Colorado, being a Report of Progress
of the Exploration for the year 1873.

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west of the Mississippi River. By Henry Gannett.

Birds of the North-West: a Hand-book of the Ornithology of the
Region drained by the Missouri River and its Tributaries. By Elliott
Cones.

T. W. HAYDEN, U. S. GEOLOGIST.

Anecdota Syriaca, collegit edidit explicuit. J. P. N. Land, Tomus
Quartus.

PROF. J. DE GOEJE, LEYDEN.

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Göttingen. Göttingische Gelehrte Anzeigen.—Nos. 5, 6. Do., Nachrichten,
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Jewish Numismatics, being a Supplement to the "History of Jewish coinage and money in the Old and New Testament", published in 1864.

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No. 1213. *S. Evans*.—Sole-leather Tanning, with some remarks on the Import of Hides and Cattle. Japanese Lacquer Ware.

No. 1214. *C. Magniac*.—On the Commercial Aspects of the Suez Canal.

„ 1215. Adjourned Discussion on Mr. C. Magniac's paper on the "Commercial Aspects of the Suez Canal." *W. Neville Kent*.—Aquaria, their Construction, Management, and Utility. Paper from Bamboo.

No. 1216. *E. Seyd*.—The fall in the Price of Silver; its Consequences and their possible Avoidance.

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W. B. Taylor.—On Recent Researches in Sound. *F. E. Nipher*.—New Form of Lantern Galvanometer.

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No. 6. *M. J. Gayat*.—De la conjonctivite granuleuse. Résumé de deux missions ayant eu pour objet l'étude des maladies oculaires en Algérie.

No. 7. *M. M. E. Mathieu et V. Urbain*.—Réponse à une Note précédente de *M. Arm. Gautier*, relative au rôle de l'acide carbonique dans la coagulation du sang. *M. Cousté*.—Sur l'origine et la mode de génération des tourbillons atmosphériques, et sur l'unité de direction de leur mouvement gyrateur.

No. 8. *M. Faye*.—Remarques au sujet des lois des tempêtes.

No. 9. *M. Schmetzler*.—Sur les propriétés antiseptiques du borax. *M. M. E. Mathieu et V. Urbain*. Réponse à la dernière Note de *M. F. Glénard*, relative au rôle de l'acide carbonique dans le phénomène de la coagulation spontanée du sang.

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No. 8. *Warren*.—Idées religieuses et philosophiques des Jaines.

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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JUNE, 1876.

The monthly General Meeting of the Society was held on Wednesday, the 7th June, 1876, at 9 o'clock, P. M.

Bábu Rájendralála Mitra, LL. D., Vice-President, in the Chair.

The following gentlemen, duly proposed and seconded at the last Meeting, were balloted for and elected ordinary Members—

Julius Behrend, Esq.

J. F. Baness, Esq.

R. Parry, Esq.

The following are candidates for ballot at the next meeting.—

Lieut. F. W. Jarrad, R. N., Depy. Supt. India Coasts Survey, proposed by Mr. J. Wood-Mason, seconded by Dr. James Armstrong.

D. Scott, Esq., C. E., proposed by Mr. J. Wood-Mason, seconded by Mr. W. T. Blanford.

Ross Scott, Esq., C. S., of Muzaffanagur, proposed by Mr. F. S. Growse, seconded by Mr. Blochmann.

Dr. D. O'Connell Raye, General Hospital, Calcutta, proposed by Dr. G. King, seconded by Capt. J. Waterhouse.

Rev. Thos. Foulkes, Bangalore, proposed by Capt. J. Waterhouse, seconded by Mr. Blochmann.

The CHAIRMAN announced that Lord Lytton had been pleased to honor the Society by accepting the office of Patron of the Society, vacant by the resignation of Lord Northbrook.

The CHAIRMAN said: "By the last mail from Germany the Council have received the melancholy intelligence of the death of Professor Christian Lassen, one of the oldest honorary members of the Society, and an oriental scholar of the highest attainments. Born in 1800 at Bergen in Norway,

Lassen retired to Germany in early youth, and passed the best part of his life as Professor of Sanskrit in the University of Bonn. He attained distinction as a Sanskrit scholar more than half a century ago, and was elected an honorary member of this Society in 1831. With the characteristic leaning of the scholars of his adopted country, he first directed his attention to Hindu Philosophy, and, in 1832, published a Latin translation of the *Sāṅkhya Kārikā*, which, though not so rigorously exact as the English version subsequently prepared by Colebrooke, was still a work of great merit, and it brought him to prominent notice as an able, clear-headed, and pains-taking student of the Sanskrit language. In 1835, he published a Latin translation of the renowned pastoral of Jayadeva, the *Gītagovinda*. He had, in this undertaking the advantage of Sir William Jones' English translation and the ductility of the Latin language—so much more allied in idiom to the Sanskrit than the English—in his favour; nevertheless high praise was due to him for the ability and scholarship with which he did such ample justice to the poetical imagery and richness of the original. The work is peculiarly oriental in its tone, feeling, form, and expression, and calculated to tax to the utmost the capacity of European translators. To English readers Dr Arnold's new metrical version will convey an idea of what the true character is of this "Indian Song of Songs," and how widely it differs from Western imagery and thought. In 1836, Professor Lassen published two works, one on some Persepolitan inscriptions, and the other a commentary on the *Pentapotamia Indica*, both replete with the results of great learning and persevering research. The work on inscriptions entailed enormous labour, as it was one of the earliest attempts at deciphering Persian cuneiform writing, but it was eminently successful. These were followed, in 1837, by an essay on the Prakrit dialects, the *Institutiones Linguae Prakriticae*, which first afforded to European scholars a clear insight into the nature and character of those ancient vernaculars. Nothing has since been published to supersede that learned essay. His essay on the "Coins of the Indo-Scythian Kings," which brought together in a systematic form the numismatic researches of our James Prinsep, and enriched them with the results of his own enquiry and study, was a work of great interest, and the Society published an English translation of it by the late Dr. Böer, in our Journal for 1842-3. A Sanskrit Anthology for school use, an essay on the Vendidad, and a valuable dissertation on the island of Taprobane, were also among the several works which he published during the first half of this century, and which secured for him a high and honorable place among the labourers in the vast field of oriental research. He was also a frequent contributor to oriental periodicals, and editor of the *Zeitschrift für die Kunde des Morgenlandes* for several years. The most important work, however, which he published and which will make his name

to be honorably remembered for a long time, is his *Indische Alterthumskunde*. In it he brought the strictest rules of classical criticism and the Niebuhrian method of distinguishing the true from the false to bear on oriental learning, and for the first time set in order the *disiecta membra* of ancient Indian history which his "predecessors and contemporaries had brought to light. We may not assent to all his conclusions, and the materials he had to work upon were certainly not always the safest and most accurate; but on the whole his work is a noble monument of his learning, and genius,—of his zeal, devotion, and unflagging industry. I am sure this meeting will, in common with Oriental antiquarians in every part of the civilized world, mourn the loss of so distinguished a scholar."

Read the following letter from Mr. H. W. I. Wood, Secretary of the Piddington Fund, forwarding Rs. 586/4 as a refund of a moiety of contributions to the Fund from the Asiatic Society.

Bengal Chamber of Commerce, Calcutta, 10th April, 1876.

The Secretary of the Asiatic Society.

DEAR SIR,—The Committee of the Chamber of Commerce desire me to inform you that as the object for which a fund was subscribed in 1870 for the benefit of the late Mrs. Piddington has been accomplished, they hold a surplus—as per memorandum at foot—which will admit of a refund of a moiety of contributions; and they direct me to hand you the sum of Rupees 586/4, your receipt for which in annexed form will oblige

Yours faithfully,

H. W. I. WOOD,

Secretary.

MEMORANDUM OF THE PIDDINGTON FUND ACCOUNT.

Subscription from Saigon Chamber of Commerce,	Rs.	100	0	0
" Madras,		470	0	0
" Colombo,		390	0	0
" Shanghai,		677	2	5
" Peninsular and Oriental Company,		100	0	0
" Asiatic Society,		1,172	8	0
" Calcutta Trades' Association,		500	0	0
		<hr/>		
		8,400	10	5
Local individual subscriptions,.....		7,269	0	0
		<hr/>		
		10,678	10	5
Interest on account with the Oriental Bank Corporation,.....		2,296	18	1
		<hr/>		
		Rs. 12,975	7	6

Paid Mrs. Piddington 100 Rs. a month from			
May 1870 to date of decease in Sept. 1875,	6,500	0	0
„ for funeral expenses, &c.,	192	5	6
„ for cost of a Monument,	587	8	0
			<hr/> 7,229 18 6
Balance,	Rs. 5,745	10	0

H. W. I. WOOD,

Secretary.

The SECRETARY said that the money had been deposited in the Bank of Bengal and that Subscribers to the Fund could receive on application a refund of half their contributions. A list of the subscribers would be found on the fly leaf of the Proceedings for May 1870.

Mr. H. F. BLANFORD said that as a subscriber to the "Piddington Fund", he would propose for the consideration of other subscribers, that the residue of the Fund now in the hands of the Society should be made the nucleus of a permanent fund for pensioning old and deserving servants of the Society.

Mr. V. BALL seconded the proposal.

The CHAIRMAN having put Mr. Blanford's proposal before the meeting, it was agreed that it should be referred to the subscribers for consideration.

The SECRETARY laid before the Meeting a copy of a pamphlet by Mr. W. C. McGregor entitled "Protection of Life and Property from Lightning during Thunderstorms," and stated that Mr. McGregor, had very kindly offered to send 100 copies for distribution among members. The Secretary also read some extracts from a short paper by Mr. McGregor, on the same subject of which the following is an abstract :

'On the Prevention of Accidents by Lightning.

The author commences by stating that although a century and a quarter has elapsed since Franklin proved by his kite experiment the similarity between atmospheric and frictional electricity, and showed that protection to life and property could be secured by artificial means, we still read announcements of churches and other public buildings, both in England and this country, being struck and injured by lightning, and two recent accidents of this kind are instanced, in one of which the steeple of the village church of Snettisham, near Sandringham, was destroyed, happily without loss of life ; and in the other, the Himalaya Hotel, Masuri, was struck, two natives being killed on the spot by the electric fluid in its pas-

sage, and others wounded, considerable damage being also done to the Hotel and the property of the inmates.

From the fact of no mention having been made of lightning conductors being attached to these buildings, the author concludes that this means of artificial protection had not been adopted, and goes on to enquire how far are Churchwardens, Hotel Proprietors and persons in charge of other large or prominent buildings justified in endangering the lives of their fellow creatures by neglecting to adopt precautionary measures against accidents by lightning—a question which the author has fully treated in his pamphlet referred to above.

The author then gives a brief notice of what has been done in Europe with regard to the prevention of accidents from lightning and goes on to suggest that similar steps should be taken in India.

At the present time very nearly all vessels carry a fixed lightning conductor as part and parcel of the vessel, instead of its being stowed away to be run up to the masthead when required, as was done on the introduction of lightning conductors into the British Navy. The same principle should be carried out with reference to buildings. Dr. Mann, Mr. Preece, Captain Galton and others have pointed out that no building should be considered complete without the necessary protection against lightning and there should be no difficulty in providing this at the same time and in the same manner as the rainpipes or gutters forming part of a building.

In France, the Prefect of the Seine has appointed a Commission, comprising several members of the Academy, to inspect and report upon the lightning-rods connected with the buildings of the Municipality of Paris. Their inspection will be annual and particular study will be made of certain of the conductors with reference to the thunderstorms which pass over Paris.

In England, a Committee has been formed under the auspices of the Meteorological Society of London for the purpose of encouraging and introducing a proper system of protection against accidents by lightning and for supervising and reporting upon the means in existence.

As a member of the Asiatic Society, the author asks if it is not a matter of sufficient importance and within the scope of its action to warrant the Society in taking some such steps for carrying out investigations and practical suggestions, within the limits of its operations.

The author expresses his belief that the Government, through its Meteorological office, would assist greatly the exertions of the Society, by allowing it to be furnished with data and information regarding accidents to life and property already reported and on record; as also of the present means employed for guarding against such accidents. The Press and the public can also assist with important information and co-operation; and if

the matter can only be properly and practicably ventilated most useful results must follow.

The author concludes by referring to a reprint, in pamphlet form, from the Quarterly Journal of the Meteorological Society for October 1875, of a paper by Dr. R. J. Mann, F. R. A. S., entitled "Remarks on some practical points connected with the construction of Lightning Conductors", with the discussion thereon, as containing much interesting information on this subject.

The SECRETARY laid before the meeting a circular containing a list of the subjects for discussion, at the ensuing International Oriental Congress at St. Petersburg, as below.

Questions pour être discutées à la 3-e Session du Congrès international des Orientalistes, proposées par le Comité-organisateur de cette Session.

PREMIÈRE SÉRIE

1. Les monuments historiques nous apprennent que la Sibirie pendant plus de 2,000 ans envoyait peuple sur peuple dans l'Asie centrale: quelles étaient les circonstances qui y produisaient ce surcroît de population et pourquoi cet accroissement et ces émigrations ont-elles cessé avec la conquête de la Sibirie par les Russes ?

2. Le Chamanisme qui jusqu'à nos jours predomine chez les indigènes païens de la Sibirie, est-il le même chez tous ? ou bien nous présente-t-il des différences selon la famille ethnographique à laquelle appartiennent ses adhérents sibériens ?

3. Nous voyons que presque tous les fondateurs de nouvelles monarchies nomades dans l'Asie centrale octroient à leurs sujets leurs codes de lois particuliers. Quels étaient les motifs et le but de ces codifications successives, étant donnée l'uniformité bien connue des coutumes et du genre de vie de ces peuples nomades ?

4. Y avait-il avant Djenguis-Khan un peuple ou une tribu du nom de Mongol, ou bien le nom Mongol n'est-il qu'un nom dynastique adopté par Djenguis pour l'empire qu'il a fondé ?

5. Quelles sont les preuves en faveur de l'opinion généralement admise que les manuscrits turcs en caractères Ouigours qui se trouvent dans les différentes bibliothèques de l'Europe, soient écrits réellement dans la langue des Ouigours, ces caractères étant employés aussi par d'autres peuples turcs dans le temps auquel le manuscrit en question se rapportent ?

6. Les renseignements sur les fêtes annuelles du Turkestan, oriental et occidental, que l'on trouve dans les annales officielles chinoises jusqu'au temps des Thans—jusqu'à quel point s'accordent-ils avec ceux d'el-Birouni

sur les calendriers des Kharizmiens, des Soghdiens (et en partie aussi des Tokhars) ? En quoi ces calendriers diffèrent-ils de celui de la Perse du temps des Achéménides, aussi bien que de celui des Sassanides ?

7. Que savons-nous de l'écriture soghdiennne ? Quels sont les monuments, où elle s'est conservée ? Est-il possible de déterminer, ne serait-ce qu'approximativement, l'époque de son introduction dans la Transoxiane ?

8. Jusqu'à quel point peut-on suivre dans les documents historiques les noms ethnographiques de "Sarte" et de "Tadjik" ? Quelles conclusions on pourrait-on tirer concernant la signification primitive et les acceptations successives de ces noms ?

9. A quelles causes pourrait-on attribuer la stabilité de la langue néopersane qui du X^{me} siècle jusqu'à nos jours n'a presque pas subi de changement quelque peu remarquable dans ses formes grammaticales ?

10. Les nombreux noms propres élamites qui se sont conservés, nous permettent-ils d'en tirer des conclusions décisives quant à la nationalité des Elamites ?

11. Peut-on déterminer d'une manière exacte sous le point de vue ethnographique et géographique les noms "Rutenu" et "Cheta", qui dans les inscriptions égyptiennes de la XVIII^{me} et de la XIX^{me} dynastie sont mentionnés comme les ennemis séculaires de ces deux dynasties ?

12. Dans quel jour apparaît dans les inscriptions égyptiennes la population de la Palestine avant l'invasion des Hyksos ?

13. Jusqu'à quel point les rapports mutuels des tribus arabes avant Mahomet peuvent-ils servir à éclaircir l'état politique des tribus israélites du temps des Juges ?

14. Les données chronologiques et topographiques fournies par les légendes des monnaies des dynasties musulmanes sont généralement considérées comme plus dignes de foi que celles des chroniques et des autres monuments non officiels : cette opinion est-elle parfaitement inattaquable ? et avons nous toujours le droit de corriger les données des chroniques à l'aide de celles des monnaies ?

15. Quelles étaient les raisons qui au commencement du XI^{me} siècle firent cesser subitement le commerce entre l'Orient musulman et l'Europe septentrionale, commerce qui florissait sans interruption du VII^{me} au X^{me} siècle ?

Dr. RAJENDRALALA MITRA read the following extract from a letter of Dr. Burnell, on the invasion of Bengal, in the 11th century, by the Chola king Kulottunga :

Tanjore, 29th April, 1876.

"MY DEAR SIR,—I am just about to leave India for Java for two months, but I must tell you a discovery I have made which will I know

interest you, as you have taken much trouble about the Pála kings of Bengal.

"It is that in a Tâmil inscription here, I have found that Kulottunga Cola states that in his 29th year* he conquered (!) Bengal (Vengâla) and Mayipâlan (*i. e.* Tâmil for Mahipâla). This 29th year = 1098 A. D., as Kulottunga began his reign in 1064 A. D.

"The whole inscription is of immense importance for the chronology of the 11th century, as a vast number of countries (in India) are mentioned, and often the names of their kings.

"Kulottunga was the greatest of the last Cola dynasty, and it is quite possible that he may have attacked Bengal (already invaded by the Muhammadans) in order to revenge himself for a real attack on the South at the end (?) of the previous century as mentioned in the Buddal pillar inscription. Buddal is apparently mentioned in the inscription; at least I can make nothing else of the word *v* (b)ottal which must be a proper name.

"Kulottunga *inherited* the kingdom of Kalinga, so was not far from Bengal.

"The whole inscription (which I hope to publish) throws great light on the sad state of S. India in the 11th century, owing to religious animosity; it is easy now to understand how the whole country fell a prey to the Muhammadans in 1311."

The CHAISEMAN remarked that in the Râjshâhi inscription, discovered by Mr. Metcalfe and published in the Society's Journal for 1867, mention was made of the founder of the Sena dynasty of Bengal having been a Dakshinâtya, or a conqueror from the South who upset the Pála dynasty; and from calculations subsequently made, it appeared that this founder, Adisura or Vira Sena, came to Bengal in the last decade of the tenth century. Now James Prinsep in his Chronological Tables had doubtfully assigned to Kulottunga an age between 800 and 1000 A. C., and if the later date could be accepted as the correct one, it would follow that the invasion referred to in the inscription was that which gave to Bengal the Sena dynasty, and that Vira Sena was a lieutenant of Kulottunga, who having conquered the country, held it, originally in the name of his master, but afterwards on his own account. This assumption, however, could not be defended, as the date of Kulottunga, according to Dr. Burnell's recent researches, was later by a century and a half, and it brought us to the time of Vijaya Sena. Curiously enough, the Râjshâhi inscription says that Vijaya invaded the Kalinga country; now that country at the time was a part of the Chola dominion, and we had thus two contemporary kings, each of whom claimed a victory over the other. On whose side the victory really lay, it was not easy now to determine, but the Râjshâhi inscription was highly eulogistic,

* This is the date of the *gift*, *i. e.* year of reign.

and in adverting to an invasion of the Western kings, the only fact on which it dwells is the stranding of a fleet of war boats on a sandbank, which it poetically describes as the "ashes on the forehead of Siva changed to mud by contact with the water of the Ganges." This was done to give a happy turn to a sad failure, and the writer who could make so much of such an accident, would scarcely scruple much to change a defeat into a victory. Dr. Burnell thinks that the invasion mentioned in the Budál inscription might be the offence which Kulottunga retaliated; but it is not necessary to go so far for the first offence: both the inscriptions might be right, and it might be that one of them describes the invasion and the other the retaliation. What the case really was could not be decided until after the publication of the whole of Dr. Burnell's inscription. It was expected, however, that it would prove of much value in elucidating several doubtful points in the history of the two kings.

Dr. RAJENDRADÁTA MITRA submitted translations of some Inscriptions from Rohtās.

No. 1.

On the jamb of a gate in the Citadel, Rohtās.

Transcript.

संवत् १९८४ चरर(वे)
 वैशाख(मास)सुदी १४ रबी(वि)वा
 सर बार रोज । यदा चरो
 य(P)सकीना । आगे मुकुदरकी (वि)
 च पिडे मुकुदरकीन

Translation.

"In the time of the Samvat year 1894, on Sunday the 14th of the waxing moon in the month of Vaisākha—on this day were born for a bright (?) career, first Muladala Siñha and afterwards Muladala Bhīma."

The inscription is in the Hindi language, but both its spelling and grammar are frightfully corrupt. The last letter of the 3rd line is clear enough, but the first letter of the 4th is doubtful. If we read the two letters together with what follows, we have *royasa līlā*, a word which I cannot explain. Omitting the first letter *yasa līlā* means 'career of renown'; the epithet, however, is not of much consequence. Who the worthies were, whose birth is here recorded I know not. To the right of the inscription there is a figure (in outline) of the renowned hero of the Rāmāyana, Hanu-mán, armed with a club.

No. 2 is a duplicate of the last.

No. 3.

On the jamb of the north gate, Citadel, Rohtās.

Transcript.

धीर गुरुनाथन(ग)च ।

Translation.

"The room of Thīra (the sage) Galunátha."

The only doubtful word in this record is the first. It looks very like an adjective for the name; if so in ordinary Hindi, it can mean quiet, peaceful, not given to much motion; but it is a very unlikely one to be used in such a place. In Pāli *thera* means a sage, an expounder, a teacher, and I am disposed to accept it here in that sense. It may, however, be a part of the name.

No. 4, is a duplicate of the last.

No. 5.

Over the inner entrance to Palace, Rohtās.

Transcript.

संवत् १६५४.

मीनचौमाच नमः(नः) चंमोधीपुरसेंदु

मिः परिमिते पुष्पाचने चाचने चैच

मासि बल्लचे पचे मलिते बड्यां तिथौ श्री

मनोः । चारे सर्वमिदं द्वयं बलितके श्रीरो

दितान्नाचके मीनकाजसमीनचे-मसदनो

कारं समासूर्यतां ॥ १ ॥ मीनचाराजाधिरा-

जसचाराजमीनामसिंपुरोदितमीध

रासिचारे म(?)नद्वयसमहेन कारितं समसदच

Translation.

"Salutation to Ganes'a. During the northern declension (of the sun), in the year of the sea, (4), the arrow, (5), the flavours, (6), and the moon (1), Samvat 1654, (The date is given on the top of the line as shown in the transcript) on Monday, the 6th of the waxing moon in the month of Chaitra, the palace of the auspicious Māna, the great lord of the earth, on the hill of Rohitāśva, the noblest of the race of hills, was repaired, during the government of Śrīdhara, the purohita of the auspicious great king of kings (*Mahārājādhirāja* the great king, *Maharāja Śrī Mānsi*). The work was done by Madabala Bhaṭṭa. Remember this."

The only doubtful letter is the first of the name of the architect; it is very like a bh, but as Bhadabala makes an unmeaning word, I prefer to take it for an m. The text is in Sanskrit, but the last sentence is in corrupt Hindi. I take it to be equivalent to *Smaran rakho*.

No. 6 is a duplicate of the last.

No. 7.

From a rock just outside of the right hand of Bagdad, west gate, Rohtás.

- (१) ९ नवतिनवमुनीन्दैर्वाचकासधीशैः परिकल्पति वस्तुं बभूवे वाचवाके ।
मदनविजययापानमले नापि चैवे प्रतिपदि पितकायौ चापयौ भावरेव ॥
- (२) यवनदक्षम-लीलानां वसैः सैवेभ्योनिर्घनयति धरिणीं वीप्रतापचित्तिन्दै ।
इदमुदकमुदारस्नानभाजां स्वरूपं नमिसमिध निरीन्दै चीनता माधवेन ॥
- (३) अनामिकमनस्यीयपापनिर्वाककारणं ।
कथमसौदरं नारि कारयानास माधवः ॥
निर्जं नच इव साधु मद्यैःस्थिति निर्मलं ।
रतद्वच दुविशीर्षं कार-
- (४) यानास माधवः ॥ अकाखे कुण्डिकाकाखनिधिर्निधिसयामिध ।
अकारि माधवेनेयं प्रया चै पातकद्रुचि ॥

Translation.

"Om. In the Sah's Sáká year of ninety (90), and nine (9), and the sages, (7), and the Indras (14), and the lords of days (12), all added up, (182,) on the day of the festival of the conquest of Cupid (*Madana-vijaya*) in the auspicious month of Chaitra, the eleventh of the moon, when the sun, Venus and Jupiter were in Pisces. When Pratapa, the lord of the earth, had, by his glory, proficient in the recreation of trampling down the Yavanas, whiteneth the earth, this well (*lit.* piece of water) delightfully clear like (the intellect of) wise men, was excavated in this noble hill by the auspicious Mádhava.

"This water, without turbidity, the agent for the wiping out of no small amount of sin, was made, even as own brother to his renown, by Mádhava.

"Even he, Mádhava, made here this wide expanse (of water), sweet even as his own words, translucent like a great fountain.

"In this sin-destroying, waterless spot was made, by Mádhava, this well, a basin of invaluable water, even like the ocean, the great reservoir of the waters."

Mr. H. BEVERLEY, C. S., made the following remarks regarding certain results of the recent Census of the Town of Calcutta.

Though the tabulation of the returns was not yet completed, Mr. Beverley thought that a brief summary of some of the results obtained might not be uninteresting to the members of the Society. It was well-known to those present that a census of the Town was taken in 1866, and again in 1872. The Census of 1872 showed a large increase in the population of

the Town as compared with that of 1866; but doubts had been cast upon its accuracy and unfortunately the papers had been destroyed. The recent census also showed a large increase over that of 1866, but not so large as that of 1872. Including Fort William and the Fort of Calcutta, the figures were for 1866,—377,924; for 1872,—447,601 and by the recent census 429,535. It should be mentioned that the first two censuses were taken in the month of January and the last in April.

Excluding Fort William and the Fort, the population of the Town proper was 409,086, and of this number 187,182, or 45·75 per cent., reside in pukka or brick-built houses. Unfortunately no information on this point was collected at either of the previous censuses, so that it is impossible with any accuracy to trace the progress of the town in this respect. Mr. Simms in his survey of 1850 estimated that no more than 81·6 per cent. of the population dwelt in pukka houses, and even had he adopted the high average of 11 souls to each house given by the recent census, the percentage would be raised to 40 only. Of course the high average referred to depended on the definition of a house, and even with regard to pukka houses, it was no easy matter to observe a uniform definition. The number of pukka houses would seem, however, to have increased of late years. In 1850 Simms counted 13,120; in 1866 there were 16,022; the present returns give 16,896. This increase moreover is altogether in houses of two or more stories, the one-storied houses actually showing a falling off, due no doubt to a difference in the method of counting rows of shops.

The average density of the population throughout the Town was 107 persons to the acre, but the density varied in different parts from 211 in the Kalátola Ward to 24 in Chowringhee.

One of the main objects for which the recent census was taken was to obtain a trustworthy basis for the calculation of a birth and death rate; and he (*Mr. Beverley*) was of opinion that that object would be to a very large extent attained. A common argument against the accuracy of former censuses of Calcutta was the disproportion in the number of males and females in the Town. If this was a defect, it was one shared by the Census of 6th April last. Putting aside Fort William and the Port, the males on that date numbered 262,455 against 146,581 females only.

In 1866 the males composed 59 per cent. of the total population.*

1872	66	"	"
1876 ..	64	"	"

But what seemed to him (*Mr. Beverley*) a most remarkable fact was that, although the totals of the three censuses varied so considerably, the number of females in the Town remained nearly constant. Thus in 1866 the females numbered 145,938; in 1872, 147,222; and in 1876, 146,581.

* In Bombay the percentage is 62 per cent.

This was a very striking result, and it was impossible to deny the conclusion that the variable element in the Calcutta population must be looked for among the males. This conclusion was borne out by the statistics in regard to age, which showed that the excess in the number of males over females was mainly to be found between the ages of 20 and 60. Up to ten years of age, the males and females were nearly equal, the males being 26,216 and the females 25,179; and over 60 years of age the males numbered 9,854 only, against females 10,774. But between the ages of 20 and 40, for instance, we found 184,820 males against 58,724 females. This clearly showed that the excess of males, so far from being a flaw in the census, was simply due to the immigration of adult males for the purposes of trade or service. It was a variable and inconstant element, and sufficed to explain both the uncertainty which hung about the population of Calcutta, and the absurdly low death-rate hitherto put forward. *Mr. Beverley* trusted that, with these figures before him, the Health Officer would be in a position to exhibit the vital statistics of this City in a new and striking light.

As so many other gentlemen had to address the meeting that evening, *Mr. Beverley* would not detain them longer than just to ask them to bear in mind two things in regard to the late census: first, that it was merely a census of the Town proper, exclusive of the Suburbs, and so did not show the entire population of the city as a whole; and secondly that it was an enumeration of the *sleeping* and not of the *day* population. If the Suburbs were taken into account, Calcutta had a population of at least 800,000 souls; while the numbers that frequented the Town for business purposes during the day would considerably augment that figure. Madras with an area of 27 square miles, had a population of less than 400,000 souls; Bombay, with 18½ square miles, 644,405. In point of mere numbers, therefore, Calcutta still deserved to be regarded as the capital of the Indian Empire.

The CHAIRMAN said that the thanks of the meeting were due to *Mr. Beverley* both for the very interesting remarks he had made, and for the ability, care and forethought with which he had conducted the last Census of Calcutta. It was expected that the result would be much more satisfactory than that of all former attempts of the kind had been. The problem of taking a census in India was an exceedingly difficult one. Subject races could not be expected to sympathise with their conquerors in the latter's attempt to collect statistical information about the domestic details of the conquered. There would invariably be apprehensions of fresh taxation, which the weak would always attempt to overcome by cunning. No amount of protestation on the part of the conquerors, who have to meet the exigencies of a progressing state by devising new sources of revenue, will convince the people of their good faith. Even if the people believed in the good faith

of their rulers for the time, they were intelligent enough to apprehend that exigencies might arise in future, which might make the facts collected bear heavily upon them. It was in the nature of weak, subject races to be shy and suspicious, and it was not easy to eradicate such feelings. Mistakes had also been made by the governors which were fatal to anything like accuracy in the different censuses which had been taken. In 1872, the strongest protestations were made by Government that the Census then about to be taken had none but scientific objects in view; but by an unfortunate coincidence a Bill was brought before the Bengal Council at the same time for legalising a Poll Tax in the towns and municipalities of Bengal; and it was easy to conceive how the one operated on the other. Nor did the effect of this mistake end with the Census of 1872; for the memory of such coincidences was not easily effaced. The Chairman hoped, however, that the ample precautions taken by Mr. Beverley had prevented any very gross errors creeping into his returns, and that those returns will be found, within a small margin, reliable for all practical purposes.

The Natural History Secretary (Mr. WOOD-MASON) exhibited a complete dried specimen of the well-known Glass-rope Sponge (*Hyalonema Serboldii*), accompanied by its inseparable 'chum' the *Palythoa* and referred those interested to the excellent account of the history of the species given by Professor Wyville Thomson in his 'Depths of the Sea.' The specimen was presented to the Society by G. G. Apcar, Esq.

Mr. V. BALL exhibited a series of Khond weapons and musical instruments from the Tributary States of Sambalpûr, and said—

The series of battle axes on the table (see Plate) exhibits the principal varieties of form used by the Khonds of the Southern tributary states of Sambalpûr. They were selected by me from the residue of a collection made by Capt. Bowie for presentation to the Prince of Wales.

At the present time when the forms of weapons in use by different races in India and Africa are attracting much attention, the collection now exhibited is one of considerable interest.

Besides the battle axes there are also some musical instruments. To one of these I would especially direct the attention of the meeting. No English name is exactly suited to its description. It is neither a harp nor a lyre, but to those instruments it is most nearly allied. It is made up of a number of reeds lashed together in a raft-like form; of each reed, a portion of the cuticle is raised and upheld by slips of bamboo placed as bridges; and it would appear that the instrument is capable of being tuned. It is played with the tongue of a little iron implement which bears a close resemblance to a jews-harp. Even in inexperienced hands, the drawing

of this tongue across the strings produces a pretty rippling sound. It is quite possible that in the hands of an accomplished performer a pleasing result might be produced.

Last year Mr. Wood-Mason exhibited a one-stringed banjo made of bamboo from the Naga Hills.

In it the principle of using for a string a small bundle of the fibres of the cuticle raised *in situ*, instead of any foreign material, was also employed.

Another instrument on the table is a sort of Banjo with one string of brass wire and a pumpkin attached as a sounding board. I have not met with the same form elsewhere.

Mr. H. B. MEDLICOTT exhibited a Meteorite from Raipur, Central Provinces, and read the following note regarding it—

Record of the Sitathali Meteorite of 4th March, 1875.

In May 1875, Mr. H. Read, the Deputy Commissioner of Raipur, forwarded to the Indian Museum, Calcutta, a specimen of a meteorite that fell in Sitathali, of the Zamindari Narra, about 62 miles east of Raipur in the Central Provinces. This would be about long. $82^{\circ} 35' E.$, lat. $21^{\circ} 15' N.$ The fall is stated to have occurred at about 11 A. M. In the letter announcing the presentation it is stated that a similar meteorite was said to have fallen at the same moment three-quarters of a mile distant from the first fall. A portion of this was also procured by Mr. Read and, at the request of the Trustees, forwarded to the Museum. Both specimens were now exhibited to the Meeting.

The most noteworthy circumstance of this fall is, that, though found at such a distance apart, the two pairs most unmistakeably fit. They weigh respectively 2lbs. 0 oz. 430 grains, and 1lb. 10oz. 160gr. When united they form a lump of peculiar shape, resembling a quarter segment of an ovoid mass—a principal convex surface, two secondary surfaces meeting this and each other nearly at right angles, having a length of $5\frac{1}{4}$ inches, and a fourth, or basal surface of quadrant shape with a radius of 3 inches. This last is unfortunately for the most part an artificial fracture; all the others having the usual black crust. There is a marked gradation of the glazing action: the main convex surface is the smoothest, though still betraying the granulation of the stone, and on it one can detect faintly, as it were the trail of the fused matter, as swept from the surface by the resisting medium. The two principal secondary surfaces are slightly concave, and dimpled: although the film is about as thick on these as on the main surface, the roughness of the stone's texture is much less disguised, while on the flat and dimpled surface of junction of the two pairs the glazing film, though quite distinct, does not completely cloak the texture and colour

of the stone. I think it is inferable that the aerolite was originally perhaps four times as large as these united pairs; and that other portions of it must have fallen. This might easily have occurred unnoticed, as the country is rather jungly.

The character of the stone is of a common type: of a pale gray colour; made up, in order of abundance, of steel-gray granules, those of clear yellow passing into ochrey granules, and of minute silvery specks, all in a whitish earthy matted matrix.

The account of the fall obtained by the native Police officer is as follows: it has the usual marks of fabrication—it is almost certain the aerolite must have fallen before the man could have heard the explosion.

Translation of a Report made by the Chief Constable, Narra, dated 8th March, being an extract from Roznamcha of that date.

Ghotan, Chamar of Mouza Singhpuri, made a report to the effect that at about 11 A. M. on Thursday the 4th March, 1875, a stone fell from the sky in Mouza Sitathali in Zamindari Narra, whereupon I despatched constable Kalamath to fetch the stone from that place, which is situated at a distance of 2 miles from Narra. The constable accordingly brought the stone together with one Shaikh Madar Baksh; from whose statement it appears that about the time above stated, a loud noise resembling the report of a cannon was heard, and on coming out of his house to see what was the matter, he observed an atmospheric disturbance in the southern direction of the village; and the stone produced fell immediately afterwards with such force that it was found buried 8 inches in the ground, at a distance of 100 paces from the village and 50 paces from the spectators themselves.

The stone smells like gunpowder, and the day in question was stormy and attended with thunder.

Narra is situated 62 miles to the east of Raipur.

Mr. W. T. BLANFORD exhibited some iron arrow-heads from Sind, and made the following remarks upon them:

I am indebted for the specimens exhibited to Mr. H. E. Watson of the Sind Commission. The arrow-heads were found by natives amongst the limestone hills which extend to the southward from the neighbourhood of Sehwan. No arrows are now used in any part of Sind nor have any of the Baluch tribes, who inhabit the country, any tradition of their former use. It may fairly be inferred that the heads now exhibited are of considerable age, perhaps some centuries old, for in so dry a climate as that of Sind, iron would rust very slowly. ♣

The forms of some of the arrow-heads appear to me familiar and I think I have seen similar shapes used amongst some of the aboriginal tribes,

but I cannot recollect amongst which, nor have I succeeded in finding figures of similar forms. Two are square bird-bolts, the others are three-edged, three of them having a conical or conoidal and one an elliptical longitudinal section; in one the three sharpened longitudinal edges are concave; none are distinctly barbed. The heads are about 2 to 2½ inches long, (those of the bird-bolts being shorter) and are furnished with a slender basal termination for fitting into the shaft.

The CHAIRMAN announced that the Council proposed to register the Society under Act XXI of 1860.

The object of the Registration was to obtain for the Society a definite legal status as a corporate body, and they would at the same time secure the right of proceeding against defaulters in the Civil and Criminal courts. As the Society now possessed large vested funds, the Council considered it very desirable that this step should be taken. Under Section XVII of the Act it was laid down that no Society established previously to the passing of the Act, but not registered under Act XLIII, of 1850, should be registered under the Act unless an assent to its being so registered had been given by three-fifths of the members present personally or by proxy, at some General Meeting convened for that purpose by the governing body. The question would therefore be brought up for vote at the next meeting and in the meanwhile a copy of the Act would lie at the Society's Rooms for the inspection of members wishing to refer to it.

The Council reported that they have appointed Mr. John Elliott, M. A., and Mr. A. M. Nash, M. A., members of the Physical Science and Library Committees.

The following papers were read:—

1. *On certain protracted Irregularities of Atmospheric Pressure in the Indian Monsoon-region, and their relation to Variations of the Local Rainfall.*—By H. F. BLANFORD, Esq., F. G. S.

(Abstract).

Mr. BLANFORD said that the subject of the paper which he had to bring before the Society was one of considerable interest, not only on account of its scientific bearings, but also, because in the validity of the views now put forward, lay our best hope of accomplishing the desired object of Meteorological Science, that of to some extent forecasting the conditions of a season's rainfall.

It discussed two theses. First, that amid all the changes to which atmospheric pressure is incessantly subject, including the redistribution of pressure over the whole country at the change of the monsoons, certain peculiar features tend to perpetuate or reproduce themselves; that, never-

theless, though of protracted duration, these peculiar features are not permanent. They characterise it may be a single season, or it may be two or more seasons in succession, and then disappear. Second, that these peculiarities in the distribution of barometric pressure exercise an important influence on the rainfall, by affecting the course and velocity of the winds which bring the rain. The laws of this interdependence require a prolonged study, but in certain cases in which the barometric anomaly has been of unusual intensity, it has appeared that the rainfall of a season has been deficient under the lee of a region in which the pressure has been higher than usual relatively to the surrounding regions; and that in the lee of a region of relatively abnormal barometric depression, the rainfall has been heavier than the average. This last relation, it was pointed out, coincides with the law of rainfall in Cyclones; the heaviest rain being in advance of the storm vortex.

The paper discusses the registers of pressure in Bengal, and the Bay, the Central and N. W. Provinces, for the seven years 1868-1874, the data being given in the form of Tables, shewing the total and relative barometric anomalies of a number of stations. The first of these tables shew how much the mean of the barometer readings of each month at each station ranged above or below the average of the seven years, for the same month and station. This difference is termed the total anomaly. In the second table, the total anomalies of certain pairs of stations are compared month by month, and it is found that as a general rule, the total anomaly of the one instead of oscillating sometimes above and sometimes below that of the other, remains higher or lower, as the case may be, for many months in succession; and sometimes through one or two years. This difference is termed the relative anomaly.

Some striking cases were described in which the relative anomaly has been of unusual intensity; more especially in 1868, when the North West corner of the Bay of Bengal was the seat of a persistent barometric depression; and in 1873, when there appeared to be an unusual depression in the neighbourhood of the Nicobars and another in Oudh and the N. W. Provinces.

A number of barometric charts were exhibited, most of which, however, had reference only to Bengal and the neighbouring Central and N. W. Provinces. Until last year it was impossible to obtain data from other parts of India to compare therewith. The charts for the first eight months of 1875, shew the distribution of pressure, wind direction and temperature over the whole of India and the Bay of Bengal; and it was pointed out that in the course of a few years such a series would afford the best possible material for the further study of the problems now put forward.

The paper will be published in full in the forthcoming number of the Journal, Part II.

2. *An account of Experiments made in 1875 and 1876, in various parts of India for the purpose of comparing the observed Temperature of the Dew-point with that computed from the Psychrometer by different methods of reduction.*—By H. F. BLANFORD, Esq., F. G. S.

(Abstract).

This paper described the results of a series of experiments made at various stations in Madras, the N. W. Provinces and the Punjab, during the dry season, for the purpose of comparing the observed hygrometric state of the atmosphere, as ascertained by the use of Regnault's hygrometer, with that computed from the readings of the dry and wet bulb thermometers. This comparison has long been a desideratum, since the formulæ by which the vapour tension, &c, are computed from the temperatures of the air and of an evaporating surface, make certain assumptions which have not been sufficiently verified; and although in the more humid atmosphere and low temperatures of Europe, the results of the formulæ are found to agree fairly well with the direct observation of the dew-point, it is by no means certain that such is also the case in the dry hot climate of India. The results of the comparison have shewn that the psychrometric method is liable to many disturbing influences, but that on the mean of a large number of observations, the dew-point computed by August's formula, with Regnault's constants, from the readings of the dry and wet bulb thermometers, exposed under an open shed, agree fairly well with the results of the direct dew-point determinations. Apjohn's formula gives a vapour-tension and humidity somewhat too high, and Glaisher's factors give too low a result in a damp atmosphere and too high in a dry one.

The paper will be published in full in the Journal Part II, No. 2.

3. *List of Birds collected on the expedition into the Daffa Hills, Assam, together with those obtained in the adjacent Durrang Terai.*—By Major H. H. GODWIN-AUSTEN, F. R. G. S., F. Z. S.

(Abstract).

The collection of which this paper is an account, was made by the author while in charge of the survey party attached to the force which, under Brigadier-General Stafford, C. B., penetrated during the winter of 1874—75 into the Daffa Hills.

The list shows that the author was tolerably successful, 29 birds (including two new forms) being added to those recorded in his previous papers on the avifauna of the N. E. Frontier, notwithstanding that he was only able to explore the small portion of the Eastern Himalaya extending from E. Long. 96° to Long. 94°, on Lat. 27°—a distance of about 60 miles, exclusive of the district of Durrang lying at the base of the hills. The hills of the Daffa country are described as clad from summit to base with dense

forest, the larger trees of which are covered with thick creepers; and the ravines are filled with a luxuriant growth of bamboos, canes, screw-pines, tree-ferns, plantains, etc. The author expresses his regret at not having been enabled to penetrate beyond this region of dense, sombre forest into the higher and unknown ranges beyond, where, he feels confident, his success in all branches of zoology would have been far greater. Finally, he expresses his indebtedness to the officers of the survey and of the force, especially, to General Stafford, for assistance rendered and for the lively interest taken by them in the work; and to Arthur Viscount Walden, for kind assistance in the identification and nomenclature of the species.

The paper will be published in the forthcoming number of the Journal, Part II, with coloured illustrations of the two new species, *Actinura Daflarnsis* and *Suthora Daflarnsis*.

Mr. W. T. BLANFORD said—

The paper by Major Godwin-Austen which has just been read is of great interest, as the author is the first naturalist who has had an opportunity of investigating the zoology of the Himalayas east of Bhutan. It is a subject for great regret that he was not permitted to penetrate further into the country. It is impossible for us to tell what reasons may have existed for the singularly small results in the way of exploration which have resulted from most expeditions of late years, doubtless there were reasons, but it is most unfortunate that in the Dafla expedition, as in that to Yarkand, so little was done with the admirable means which existed. At the close of the Dafla campaign, there was an overwhelming force in the country, there were ample means of carriage, and there were thoroughly competent officers, Major Godwin-Austen himself being an admirable example, who only asked to be allowed to go on, but nothing was done, and to this day peaks and mountain ranges within view of our own possessions are as thoroughly unexplored as if they were at the South Pole.

4. *On an Ancient Kitchen-Midden at Chaudwar, near Cuttack.*—

By V. BALL, Esq., M. A., F. G. S.

It is more with the object of putting on record a few facts in reference to a discovery recently made on the site of the old city of Chaudwar, and of thus anticipating the possible promulgation of an erroneous view which the discovery at first gave rise to, than because the facts are of themselves of much importance, that this note has been written.

On my arrival in Cuttack last November I was informed that a block of laterite, raised in the quarries at Chaudwar, had been forwarded to the irrigation works at Marsagni where it was observed to contain fragments of pottery and to be, as a building stone, unsuited for the purpose to which it had been destined. Subsequently it was removed by Mr. Macmillan, the

Executive Engineer to his own house in Cuttack where he kindly gave me an opportunity of examining it, afterwards forwarding it to our Geological Museum where it may now be seen by any one interested in the subject.

Although I could detect no very sharply marked line of demarcation between the portion of the block which contained the pottery and that which was free from any trace of it, still it was apparent that, in so far as this particular specimen was concerned, the layer of pottery was superficial in other words was *on* not *in* the laterite.

It was evident that to fully understand the relations, a visit to the quarries was necessary, as, without seeing the rock *in situ*, no certain conclusion could be drawn. On reaching Chaudwar, the site of old Cuttack, on the north bank of the Mahanadi, I found that throughout a considerable portion of the area occupied by the quarries, the cuttings, down to the surface of the laterite, disclosed sections of from one to three feet of a layer of broken pottery and bones, in fact, the remains of an ancient Kitchen-Midden.

The base of this layer, the portion in contact with the laterite is firmly cemented by ferruginous matter; but higher in the sections the deposit becomes looser and looser as it rises to the surface.

In some cases the pottery is so firmly attached to the laterite that it cannot be detached without fracture.

It is not, I think, necessary to suppose that the laterite was in a soft or only partially formed condition when the pottery was first thrown down upon it. The percolation of waters from above, more or less charged with organic matter, may have acted upon its upper surface in such a way as to cause the solution and subsequent deposition of the ferruginous matter which now includes and binds to the laterite the fragments of pottery.

Had this been a *bond-fide* case of the occurrence of pottery *in* laterite it would have had an interest very much greater than it can be now said to possess. Although evidence, that of stone implements, has been found of the existence of man while one of the forms of laterite was being deposited, it still remains to be proved that man, so far advanced in knowledge of the arts as to manufacture pottery, lived in India at so early a period.

As to the age of the deposit, the date of the founding of Chaudwar, the capital of Orissa, would only furnish a rough indication; but even it is not certainly known. Mr. Beames puts it at probably 850 A. D., other authorities so far back as 23 A. D.* Either probably sufficiently remote for the completion of the operations giving rise to the phenomena above described and which belong most distinctly to the, geologically speaking, present period.

* See on this subject Indian Antiquary, February 1876, p. 55.

5. *On Stone Implements found in the Tributary States of Orissa.*—

By V. BALL, ESQ., M. A., F. G. S.

It seems to be not improbable that it will be possible, ere long, to trace with a considerable degree of accuracy, the geographical distribution in India of those early races who employed stone in the manufacture of implements and weapons. In the meantime, with this end in view, it is most important that all discoveries should be recorded. Since the year 1867, when a list by me was published in the *Proceedings*, of the then known localities where stone implements had been found in India, the number of such localities has been nearly doubled. As of many of these there is no printed record, I have collected the information as far as possible and hope to be able to present shortly before the Society a list revised up to date.

As an example of the interesting points which a comparison of the special character of these implements from different localities may sometimes produce, I need only refer to Genl. Sir Arthur Phayre's remarks* upon the implements of the Burmese type from Singhhum, which I exhibited here last year. Sir A. Phayre shews that the part of Burma in which the stone implements occur—the valley and delta of the lower Eráwati—is inhabited by a race called *Mín* whose language presents affinities with that of the *Múndás* of Singhhum. Hence the probability of an early intercourse having existed, and possibly of an identity of origin between these now widely separated peoples, becomes very great.

The implements which I now exhibit belong to quite a different type from those just mentioned. They are roughly chipped quartzite axes similar to those which have been found so abundantly in the Madras Presidency and in smaller numbers in the Central Provinces and other parts of India. Excluding one of doubtful artificial character there are only four specimens. These I picked up on the surface at different localities in Donkenal, Ungul, Talchir, and in Sambalpúr.

Donkenal. The specimen from this locality is very rudely formed and has the point broken off by a recent fracture. It was found together with the debris from a laterite conglomerate; and from the fragments of ferruginous matrix still attached to its surface there can, I think, be little doubt that it was at one time imbedded in the laterite. The material is an opaque, slightly granular quartzite.

• *Ungul.* This specimen was found in the bed of a stream near the village of Kaliakota. Its shape, a broad oval, is unusual. The material is a vitreous quartzite.

* P. A. S. R., January 1876, p. 3.

Tulehîr. This specimen was found on the surface near Hurichandpur. It is the best formed of the series. The material is a vitreous quartzite not improbably derived from a vein.

Sambalpur. This specimen was found near Bursapali to the north of the locality well known village of Kudderbuga. It has a pointed wedge-shape. The material is a vitreous quartzite.

6. *On the femoral Brushes of the Mantidæ and their Function*.—

By J. WOOD-MASON, Esq.

(Abstract).

The author states that, while recently examining a specimen of a species of *Hierodula* from the Nicobars, his attention was arrested by two brightish oblong spots, situated one near the distal end of each of the fore femora and nearer to the lower dentate than to the upper entire edge of the joint; and that on examining these spots more closely by the aid of a lens he had found that they were brushes of stiff hairs, all of which were directed away from the upper edge of the femur, some of which, namely, those forming the upper half of the brushes, were closely appressed to the surface and threw back the light strongly, and the rest of which projected almost straight out from it and were the stiffest of all. He had been unable to find any account of these structures in any entomological work to which he had access; and neither M. de Saussure, who had recently published an admirable account of the external anatomy and habits of the whole family, nor Dr. Fischer, the author of the learned Latin work on the Orthoptera of Europe, had made any mention of them. These brushes occurred in a large number of Asiatic, European, African, and Australian forms, and probably universally throughout the whole group, although he had examined none of the American species, which, however, were hardly likely to prove an exception to the rule.

He finally discusses the probable function of the brushes, and concludes that they are used for cleaning the parts of the mouth after feeding, just as the pollen-brushes of bees are used by them for freeing their bodies from the pollen grains with which they have been powdered during their quest after honey.

The paper will be published in the Journal, Part II.

7. *On the Geographical Distribution of Schizoccephala, a Genus of Mantidæ*.—By J. WOOD-MASON, Esq.

(Abstract).

The author states that so far from being a peculiarly African form, as it is considered to be by M. de Saussure in his recent monograph of the

family, the remarkable genus *Schizoecephala* is one of the most widely distributed not only of *Mantide* but of insects in India; and, in support of his statement, gives a long list of localities from which he has received either perfect or immature examples of the (?) single species *S. bicornis*, viz., the Karakpur hills in Behar, Devapur and Chánda in the Central Provinces, Kaladgi in the Bombay presidency, Kachh, Ceylon, Murshidabad and Calcutta in Bengal, Pegu, &c.; and quotes the old entomologist Stoll, who describes and figures examples from Tranquebar and China; and Professor Westwood's 'Arcana Entom,' in which it is referred to as an Asiatic form. Finally, he concludes either that the locality given by M de Saussure is erroneous or that that author's specimens, if really from South Africa, represent a second species of the genus.

8. *Description of a new Cat (Felis Shawiana) from Eastern Turkistán.*
—By W. T. BLANFORD, Esq, F. R. S.

Mr. BLANFORD said—The skin of a cat, which was amongst the collections made by Dr Stoliczka in Eastern Turkestan, was too imperfect to be satisfactorily identified. A much better specimen has since been brought by Mr. Shaw from the same country, and of this the skeleton has been kept, as well as the skin. It proves to be a new species resembling *Felis (Ohaus) caudata*, of Western Turkestan in colouration, but having a shorter tail and a differently formed skull. It is proposed to name this cat after Mr. Shaw, to whom we are so largely indebted for our knowledge of Yárkand and Kúshghar.

The description will be published in the forthcoming number of the Journal Part II.

The reading of the following papers was postponed—

1. On the Physical Geography of the Great Indian Desert, with especial reference to the former presence of the Sea in the Indus Valley, and the Origin and Mode of Formation of the Sand-hills. By W. T. BLANFORD, Esq., F. R. S.

2. Notes on the Inhabitants of the Nicobars. By F. A. de ROEPSTORFF, Esq, Extra Assistant Superintendent Port Blair and Nicobars.

LIBRARY.

The following additions have been made to the Library since the Meeting held in May last.

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,

presented by the respective Societies or Editors.

Berlin. Königliche Preussische Akademie der Wissenschaften,—Monatsbericht, February, 1876.

Siemens.—Über die Abhängigkeit der electrischen Leitungsfähigkeit des Selen von Wärme und Licht. *Peters*.—Über die Grundlagen einer Ethnographie Deutschland's mit besonderer Berücksichtigung von Friesland. *Zincken gen. Sommer*.—Über die genaue Darstellung der Brechung eines Strahls durch ein Linsensystem.

Bombay. The Indian Antiquary,—Vol. 5. Pt. 55.

C. Horne.—Notes on villages in the Himalayas, in Kamson, Garhwál, and on the Satlej. *D. P. Khakhar*.—Castes and Tribes in Kachh. *J. F. Fleet*.—Sanskrit and old Canarese Inscriptions, continued. Nos. XVI, XVII, and XVIII. *Sir W. Elliot*.—On some remains of Antiquity at Hánagal. *Dr. G. Bühler*.—Two Inscriptions from Jhálrápáthan. *Rev. F. Kittel*.—The Washerman Virasena: a Lüngáyla Legend. *Rev. J. Cain*.—Legends and Notes on Customs.

Boston. American Academy of Arts and Sciences,—Proceedings. New Series, Vol. II, May 1874 to May 1875.

S. H. Scudder.—Historical Sketch of the Generic Names proposed for Butterflies: A Contribution to Systematic Nomenclature. *C. H. Williams*.—Intensity of Twilight. *W. O. Crosby*.—Light of the Sky. *E. C. Fokoring and D. P. Strange*.—Light absorbed by the Atmosphere of the Sun.

Calcutta. The Christian Spectator, Vol. 5, No. 60.

———. The Indian Medical Gazette, Vol. XI, No. 6, June, 1876.

———. The Rámáyanam, Pt. 5, No. 6.

———. Geological Survey of India (Records.) Vol. IX, Pt. I, 1876.

W. T. Blanford.—On the Geology of Sind.

Cambridge, U. S. Illustrated Catalogue of the Museum of Comparative Zoology at Harvard College, No. VIII.

T. Lyman.—*Ophiuridae* and *Astrophytidæ*, including those dredged by the late Dr. William Stimpson.

Genoa. Museo Civico di Storia Naturale, Annali, Vol. VII.

London. The Geographical Magazine,—Vol. III, Nos. 4 and 6, April and May, 1876.

No. 4. *A. Vambery*.—The Russian Campaign in Khokand.

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presented by the Authors.

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GOVERNMENT OF INDIA, HOME DEPARTMENT.

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GOVERNMENT OF BENGAL.

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Annual Report of the Trustees of the Museum of comparative Zoology at Harvard College in Cambridge U. S., together with the Report of the Committee on the Museum for 1874.

TRUSTEES OF THE MUSEUM.

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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JULY, 1876.

The monthly General Meeting of the Society was held on Wednesday, the 5th instant, at 9 o'clock P. M.

Bábu Rájendralála Mitra, LL. D., Vice-President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The following presentations were announced—

1. From the Hungarian Academy of Sciences, a bronze Medal struck by the Academy in commemoration of the completion of its great Hungarian Dictionary, edited by the late G. Czuczor and J. Fogarasi.

2. From Dr. Rájendralála Mitra, a copy of the "Atlas of Northern Antiquities."

3. From the Secretary of State for India, a copy of a work entitled, "Primitive Tribes of the Nilagiris," by the late J. W. Breeks, M. C. S.

4. From A. V. Nursingrow, Esq., a copy of the "Results of Meteorological Observations, 1875, taken at G. V. Juggarow's Observatory, Dabba Gardens, Vizagapatam."

5. From J. Calvert, Esq., a drawing of an Ancient Temple at Jugget Sookh, Kulu Valley, and some lithographs of sculptures in Kulu.

6. From Bábu Nílcomal Basák, through Dr. Rájendralála Mitra, 5 vols. of a MS. Sanskrit Dictionary, with 60 specimen pages, printed in Bengali, compiled by the late Bábu Káśínátha Basák.

The following letter from Dr. Rájendralála Mitra accompanied the donation—

"I send herewith, for presentation to the Society, in the name of Bábu Nílcomal Basák of Kálákar Street, Calcutta, five volumes of a MS. Dictionary of the Sanskrit language, and also sixty specimen pages of the same, printed in the Bengali character. The work was compiled by the late Bábu Káśínátha Basák who died about forty years ago. He was a distinguished Sanskrit and Persian scholar, and for his time a good English writer, having been in the habit of preparing briefs for barristers of the late Supreme Court of Calcutta. He was much re-

spected by his countrymen for his learning, wealth and social qualities. The Dictionary is remarkable for being the first of its kind prepared by a native without European assistance or superintendence. It is alphabetically arranged, fuller in vocables than the 'Śabdakalpadrūma' of the late Sir Rājā Rādhākānta Deva, and gives the etymology of every word. In the last respect it is superior to both the 'Śabdakalpadrūma' and the Dictionary compiled under the superintendence of the late Dr. Wilson. The work was completed in eight volumes, of which the 1st, 3rd, and 5th are lost. The second volume is devoted to the letter क, the 4th to ख to क, the 6th to ग to क, the 7th to छ to क and the 8th to च and क. The codices seem to have been sadly neglected, and have suffered much from damp and the ravages of rats."

7. From F. S. Growse, Esq., through Dr. Rājendralāla Mitra, a copper-plate grant of Govindachandra of Kanauj, dated A. D. 1111, with transcript and translation by Bābū Durgārāma Basu, B. A. and B. L.

Dr. Rājendralāla Mitra writes regarding it :

"I send herewith a copper-plate grant, forwarded to me by J. Growse, Esq. of Mathurā, for presentation to the Society. I send also a transcript and a translation prepared by Bābū Durgārāma Basu, B. A. and B. L., Pleader of the High Court, who undertook the decipherment of the record at my request.

"The plate was accidentally turned up, in the year 1809, at a place called Rāhan in the Etāwa district, by a kachhi while digging in the fields. It is quadrangular in shape, measuring across the middle $19\frac{1}{2} \times 13$ inches, but the edges are slightly curvilinear. At the middle of the upper edge is rivetted a clasp holding a ring.

"The record comprises 29 lines, extending lengthwise over the whole surface of the plate, except the last line, which terminates at about the middle, the space after it being filled up by the figures of a conchshell and an arrow. The characters are of the Kuṭila type.

"In its preamble and the imprecatory verses, the record is a counterpart of the several inscriptions of Govindachandra of Kanauj, already published in the Journal—the last by me in 1873. The dynasty is the same, and described in identically the same words. The subject, the grant of a plot of land measuring four ploughs, in the district of Kamaitha, to one Bhaṭṭa Brāhmaṇa Guḡachandra of Bhaṭakābara, is also of little interest. But it bears the date, the 15th of the wane in the month of Pauṣa, Samvat 1106, equal to A. C. 1111, when his father, Madanapāla, was still the reigning sovereign, which shows that he must have succeeded his father some time after A. C. 1111, and not between 1108 and 1117 of the Christian era, as conjectured by me in my paper of 1873 (*Journal* XLII, p. 816.)"

16. यामे चक्षुषां चतुर्भिः प्रसाधः ॥ सीरा १ सज्जस्यसाधोवरपावाचमिरनदीवम
वादीकासनभूकसौचस्यवाकरा । ऊर्द्धावाःसिद्धिपुता सद्यपराधस्या ङ्क्—
17. यथासाकरादायसहिता । सं ११६६ वैश्वदि १६ रवी । अथभासतिकायां देव-
तामुराचयते । यमुनायां यथाविधिना क्षाला देवनमुष्यधितर्पणाद्यनन्तरं
18. भगवन्तं कथ्यं उपस्थाप्य । तदनु चाभीष्टदेवतां मन्त्रेणैव पञ्चमिदपचारैः समन्वयेन
भगवते जातवेदेने पूर्णाहुतिं दत्त्वा राजप्रत्ये सधितरि ज्ञातापिनो—
19. राजभक्तं पुण्यश्रेयसिदये ॥ अहमाद्यायाय गुणापौषाय दीक्षयेपुषाय । मतकवद-
यानविनिर्गताय साङ्गायनग्राहिने ज्ञातम रतय (चौतय्य) चाङ्गि—
20. रसविप्रदाय मुताध्ययनसम्पन्नमाद्यनमुष्यन्माय विद्महेन मनसा कुम्भपूतेन चसो-
दकेन चित्तुदधिपयनाम्बुदाभि यावत् । रायक श्रीकव—
21. राप्रवाचेष्ट(P) आभ्यन्तरेण प्रदत्तः ॥ इति मत्ता सधा(यथा) दीयमानमाममोगकुडक-
विंशतिद्वयवा गुरुरादय । अथपठसादायवसदी कुमरगमिगदिवायकाक—
22. रश्मिरस्यवाद्याभ्यन्तरसिद्धि रतत्यर्थं । अन्यदपि भूम्या वा+शेत्यस्यमानं सदाज्ञा-
पासनप्रवर्धनैर्भूता रतत्यर्थंमन्त्रैरप(उप)नेतयं रतत्यन्तये अपि न कोना—
23. यव वाषा कार्या । मुता मुनीनां वषः । अर्द्धं भद्राभ्यन्त(वर्ग) अर्धं वरादा वरावरादा ।
भूदानमुमपुष्यसि अर्द्धं अर्गः पुरन्दर । भूमिं या प्रतिपद्यति यथ भूमिं
24. प्रयच्छति । तावुभौ पुण्यकर्माभौ नियतं अर्गमामिनौ । वज्रनिर्वदुषा मुता राजभिः
सगरादिभिः । यथ यथ यदा भूमिस्तथ तस्य तदा यथ । अर्द्धां
25. परदत्तां वा ये चरेत वसुधरां । स विद्यायां कर्मभूता पित्रभिः सच सज्जति ॥
पटिवर्षस्यवाशि अर्गं वसति भूमिदः । आन्देता चानुमना च तावन्नि नरके
26. वसेत् । गमेकां सार्धनेकस्य भूनेरयेकसकुलं । चरन्नरकमाप्नोति यावदाज्ञतर्पणं ॥
यानीच दत्तानि पुरा अरेन्द्रीनानि यानीयंयस(म)ञ्जराधि । नि—
27. कौश्यान्मप्रतिमानि तानि को नाम साधुः पुनरादहीत ॥ ये पात्रानि सवीर्यतो
मम कुले किंवा पराजित् सवीं । मेवासेव मयाञ्जलिर्निर्दिशिता मादेयम—
28. क्षात् क्षियत् । कूर्वाकायसपि अथर्धमिरता इतं यथा पात्रतां । वायुर्माक्षति
तप्यति प्रतपनः मुता मुनीनां वषः । क्षिप्ता(ते)यं सद्यतकवी—
29. गार्हपत्यमुद्रया विभुवनपात्रेण ङ्कुरमीदेवाङ्कुतेनेति ॥ ङ्कुडङ्कुटेन चातेचर-
ङ्कुतेनेति ।

*Translation of a copper-plate Grant of Govindachandra of Kanauj, dated
A.D. 1111.*

1. Om: salutation to the supreme Spirit. May that agitation at the commencement of his dalliance with Sri, when her hands rolled about on the neck and shoulders of eager and lustful Vaikuntha, be to your prosperity.

2. There was, in the dynasty of Gáharabála, a king named Mahítala, who had conquered all his enemies. Though he was not the Śeṣha, yet the serpent Śeṣha was gratified by placing into his hands the task of upholding the immense weight of this earth.

3. On the extinction of the two well known Kshatriya races descended from the sun and the moon, the Selfborn (Bramhá), perceiving that the chanting of the Veda was extinct in the whole universe, was inclined to incarnate himself on earth in order to reclaim the lost path of virtue as also the two celebrated Kshatriya races.

4. He was then born in that dynasty, as king, Śríchandra Deva, the best of kings, the dispeller of the gloom of impatient heroic enemies; by whose glorious majesty was repressed the revolts of the subjects of the unrivalled great kingdom of auspicious Gádhipura, which had been earned by the valour of his arms.

5. Repairing, as a protector, to Kási, Kusíka, Uttara Kosála, Indrasthána and other places of pilgrimage, he marked the earth by the performance of a hundred *tulá* rites, in course of which he repeatedly gave to the twice-born his own weight in gold.

6. His son was Madanapála; that crest-jewel of the lords of the earth flourishes as the moon of his race. By the waters, which sparkled in jars at his coronation, the earth was washed clean of all the sinful dust of this iron age.

7. When he went forth to conquer on the earth, sinking under the overpowering weight of the footfalls of his maddened and careering elephants, high as lofty mountains, the serpent Śeṣha, crushed as it were by it, and having its crest-jewel fractured and thrust down into its bleeding mouth, for a time hid its face in its folds.

8. From him descended, even as the moon issued forth from the ocean, the charming and beautiful Govindachandra, who has acquired as much fame as Ráma, son of Daśaratha. He, by repeated battles, compelled Hammíra, who was much dreaded for having broken the heads of the huge, intractable elephants of Gaura, to sue for peace. He, who was well skilled in conquering the earth and was a Kalpa brihsha to beggars, flourished here to efface from his kingdom the footprints of the constantly neighing and careering horses.

9. Śrí Madanapála Deva, the highly revered, the great king over great kings, the chief lord, the devout worshipper of Śiva, successor of the highly revered, the great king over great kings, the supreme lord, the devout worshipper of Śiva, Śríchandra Deva, the sovereign who by his arms carved the happy kingdom of Kánnyakubja reigned victoriously.

Govindachandra Deva, the son of this great king, commands and acquaints the inhabitants of the principal towns in the district or circle of

Romaitha, and of the neighbourhood, as also rājās, queens, priests, ministers, justiciaries, treasurers, physicians, astrologers, guardians of female apartments, and the owners of all sorts of properties. Knowing that all living beings are mortal and frail, and life, like a drop of water on a blade of grass subject to the influence of the wind and sun, is impermanent, and as unsteady as a drop of water on a lotus leaf, or like the bubble of water caused by rain drops, gone the moment after it is seen ; that the pleasures of the senses are transitory, and life is always passing ; being further assured by the otherwise conflicting Smritis and Śruties that a gift of land secures eternal blessing, four ploughs of land in this village together with their soil and water, hills and rivers, orchards of mangoes, and madhuka trees, iron and salt mines, and with everything that is above and below that land, along with the power of inflicting punishment on the people according to the nature of their offences and of realizing the rents of grass, leaves and mines, I grant, for the increase of fame and virtue of myself and of my parents, unto Bhaṭṭa Bráhmāṇa Guḡāchandra, son of Rilhi, grandson of Guḡá, inhabitant of Bhaṭakáhara, of the Sánkháyaṇa Gotra, having Gautama, Ābithatha and Angirasha for his threefold Pravara, and is well versed in Śruti ; by this patent, with a pure heart, with hands consecrated by water and kusa grass ; for the period of the duration of air, water, earth and ocean, on this the 15th day of the wane in the month of Pausa, Samvat 1168, when the sun is under the influence of Ráhu, having bathed with due ceremonies in the Yamuná at the bathing place called after the god Muraitha in Bhasatika, having offered libations of water to gods, men and my ancestors, having worshipped the sun and then my god of special adoration, Maheśvara, with fivefold offerings, and having made full offerings to the fire.

Knowing this you must render unto him, according to my commands, the twentieth part of all usufructs and taxes for justice, fragrant grass, salt and diamond mines and other taxes, whatever have to be given. No body should in any way interfere with this.

1. O Purandara, heaven is the reward of those who give away a conchshell, a homestead, an umbrella, choice horses, excellent elephants, lands, trees, and flowers.

2. Both he who accepts lands and he who grants them are equally meritorious and dwell eternally in heaven.

3. The earth has been enjoyed by many kings, including Sagara and others. To whomsoever belongs the earth for the time being, he enjoys the fruit (of such gifts).

4. Whoever robs earth, whether given by himself or by others, becoming a maggot, sinks with his parents into ordure.

5. The donor of lands dwells in heaven for the space of sixty thousand years : the resumer and the abettor thereof are doomed to abide in hell for a like period.

6. He who robs a cow, a gold piece, or a finger's breadth of land, dwells in hell until the dissolution of the universe.

7. All the gifts of former kings are productive of virtue, wealth and fame—how can he, who claims the name of goodness resume them, which are to them but as emblems of vomited food?

8. With folded hands this is my prayer to all future sovereigns whether of my dynasty or of others, that they should never take any tribute from this village, not even a blade of durbá grass. Those who wish to do their duty should, obedient to the mandates of sages, preserve intact my gift, (as long as) the wind blows and the sun continues to shine.

Written by Tribhuvanapála, son of Thakkura Devánga, under orders of Gángeya. (Engraved?) by Sunathakkura, son of Sátehara.

The following gentlemen, duly proposed and seconded at the last Meeting, were balloted for and elected ordinary Members—

Lieut. F. W. Jarrad, R. N.

D. Scott, Esq., C. E.

Ross Scott, Esq., C. S.

Dr. D. O'C. Rayo.

Rev. Thos. Foulkes.

The following are candidates for ballot at the next Meeting—

J. Hector, Esq., Bank of Bengal, proposed by Dr. T. Anderson, seconded by Mr. W. T. Blanford.

Major O. B. St. John, R. E., Superintendent Mayo College, Ajmere, proposed by Mr. W. T. Blanford, seconded by Mr. H. F. Blanford.

P. T. Carnegie, Esq., Political Agent, Naga Hills, proposed by Capt. J. Waterhouse, seconded by Mr. H. Blochmann.

Mr. C. T. Buckland has intimated his desire to withdraw from the Society.

The CHAIRMAN brought before the meeting the question of the Registration of the Society under Act XXI of 1860, announced at the last meeting; and on the proposal of the Council that the Society should be so registered being put to the vote it was carried unanimously.

Mr. BLOCHMANN laid before the Meeting the following prospectus of the proposed new Edition of Tabari, by Prof. M. J. de Goeje of Leyden.

THE PROJECTED EDITION OF TABARI.

The ancient Arabic chronicle has a very characteristic form. Each important fact is related, if possible, by an eye-witness or contemporary,

whose account came down through a series of narrators to the author. If he has obtained more than one account of a fact, with more or less important modifications, through several series of narrators, he communicates them all to the reader *in extenso*. Thus we are enabled to consider the facts from more than one point of view and to acquire a vivid and clear notion of them.

In this style a universal history, from the Creation down to A. D. 915 (302 of the Hidjra), was written by Tabari of Bagdad, an author whose veracity, accuracy and stupendous learning are justly eulogised by all, whether Moslems or Christians, who consulted his work. The original work was very extensive, so that the author, who was 78 years old on concluding it, resolved to devote the remaining years of his life to its abbreviation for general use. (He died in the beginning of 924.) Still his history remained a very bulky work. According to my calculation, it will fill in print twenty large volumes in 8vo. Its great extent rendered compendiums for private circulation necessary; they were generally employed and hence the original work became rare and only to be found in the great libraries. Of the best known abridgment made in 963 and written in Persian, Dr. H. Zotenberg gave a French translation, which has just been completed. The interest of this publication is incontestable, but it is far from indemnifying us for the want of the original work. For the Persian epitomator not only dropped a great many very interesting particulars, and modified here and there the facts, but what is most important is wanting: the different accounts of an event have been arbitrarily blended into one single narrative, or rather one, and not always the best series of traditions, has been followed, and the accurate statements regarding the transmission of the traditions from the first narrators down to the author have been altogether left out.

What the use of abridgments had begun, Timur and the decay of civilisation all but completed. It is even now doubtful if a single copy of this great work is still in existence out of Europe. Prof. Sprenger was told in 1848 that two complete copies were to be found at Medina. An Indian friend of his, who not long afterwards went on a pilgrimage to Arabia undertook to inquire about them. As the libraries are closed in the sacred month, he could not even get sight of the volumes, but was informed that the work really existed. M. Kunik of St. Petersburg tells in his interesting Appendix to Dorn's *Caspia* that Gottwaldt induced two hadjis of Kasan to make researches about the existence of a copy at Medina. They brought home the vague information that a copy had existed, but as they were told, the volumes had been transported to Constantinople. I think the latter information less trustworthy than the former. To resolve this very important question, M. A. von Kremer of Vienna wrote to Sheikh

Jusuf Dhiya al-Khalidi at Jerusalem, who promised to procure the requisite information, and Prof. Koch of Schaffhausen wrote to the Sherif of Mekka.

For the rest, parts of the work, mostly from different copies, are to be found in several libraries. Köprülü-library in Constantinople possesses 8 volumes, the British Museum 8, the Bodleian in Oxford 4, Berlin 6, Paris 4, Leiden and Algiers each 1. A provisional investigation afforded the satisfactory result, that it would be possible to restore a complete copy by help of all these dispersed volumes. From that moment, I firmly resolved to take the preliminary steps for preparing an edition of this most important work, and to see whether it would be possible, with the aid of others, to realise the plan.

The first decisive measure was brought about by the late Professor Stähelin of Basel, whose loss we had to deplore last summer. The 22nd December, 1872, I received a letter from Prof. Socin, in which in the name of Stähelin a certain sum was placed at my disposal, if I should feel inclined to take the lead in preparing an edition of Tabari. This contribution (5000 francs), together with a sum of 1500 guilders, placed at my disposal by the Minister of the Interior in the Netherlands, enabled me at once, with the assistance of Dr. Mordtmann, to get copied in Constantinople the first part of the first volume and the parts that contained the years 87—40, 51—64 and 158—302 of the Hidjra, and in London the second part of the first volume. Thus a beginning could be made with the preparation of the text. To Dr. Barth of Berlin was assigned the part of the first section containing the pre-islamitic history up to the Sassanides, to Prof. Nöldeke of Strassburg that containing the history of the Sassanides. Prof. Loth of Leipzig undertook the edition of the life of Muhammad and the four "righteous" Khalifas, the latter part of which has been published by Kosegarten from the Berlin manuscript (1831—58). Prof. Thorbecke of Heidelberg took upon himself the first, and Dr. Müller of Vienna the second part of the history of the Omayyades, Dr. Grünert of Leipzig the first part of the history of the Abbasides, whilst the latter part remained for my own share. Perhaps it will be necessary to seek one or two more collaborators, some parts of the work being very extensive.

Thus the task is portioned out, and the study of the text has commenced. But before the whole can be fairly started, there is still a great deal to be done. The third part of the Constantinopolitan manuscripts has been copied, and one volume in London; we have still to get copied the two thirds in Constantinople and the two remaining volumes in the British Museum. It will, too, be necessary to have the copies made in Constantinople once more collated with the originals in the Köprülü by a young Orientalist of capacity. If a copy of the work exists at Medina, we

neither can nor may do without it, but must have it copied. Then, though Messrs. Brill of Leiden proposed to publish the work at their costs, I think it very probable, that a contribution towards the expense of printing ought to be paid, especially as we must insist on two points, 1st, that the price of a volume of about 640 pages in 8vo. be not above S. 16; 2nd, that the printing be executed at the rate of 8 sheets of 16 pages per fortnight.

For these purposes a large sum of money is requisite. My learned friends, Prof. Dozy, in his letter to Mr. H. W. Freeland, of Chichester (printed in the *Academy* d. d. 27 Nov. 1875, p. 557), and Prof. Amari, in his letter to M. de Gubernatis (printed in the *Rivista Europea*), having invoked the assistance of all who understand the importance of this publication for the promotion of science, I feel myself justified in appealing to all who may deem the success of the enterprise an object worthy of their support. The work of Tabari is truly a mine of useful information for the historian. Even for pre-islamitic history it is not without value; Prof. Nöldeke calls its history of the Sassanides "a very precious source." How very highly Prof. Sprenger, the author of the *Life and Doctrines of Muhammad*, esteems the work, appears from a passage in one of his letters to me quoted by Prof. Dozy. Dr. Zotenberg says in his Preface, that especially for the history of the Omayyades, the work of Tabari is the principal and richest source. The Russian historian M. Kunik deems the publication of this work of "the father of Muhammadan universal history" so important, that he calls it a duty for the empire, which possesses the Caucasus and reigns on the Shores of the Caspian, to provide for a complete edition of Tabari.

The work is to be published in three parallel series, the first comprising the pre-islamitic history, the life of Muhammad and the reign of the four "righteous" Khalifas; the second the history of the Omayyades; the third that of the Abbasides. In order to bring the parts printed as soon as possible into the hands of the student, it will be issued in half volumes of about 320 pages. Every year one half-volume of each series will appear.

M. J. DE GORJE,

Professor of Arabic, Leiden University.

LEIDEN, *March* 1876.

Mr. BLOCHMANN exhibited an ink impression of a silver coin of Sháhjahán II, received from General Cunningham, C. S. I. The legend is as follows—

OBVERSE— سكه مبارك بادشاه غازي شاه جهان [ثانی] ۱۱۷۴

REVERSE— سنه ۱۱۷۴ جلوس میمنت مانوس ضرب احمدنگر قزوین آباد

OVERSEER.—The auspicious coinage of the victorious emperor Sháhjahán (II.).

REVERSE.—In the first year of the auspicious accession. Struck at Ahmadnagar-Farrukhabád.

Mr. BLOCHMANN said—A few months ago, Mr. Delmerick forwarded to the Society a second list of unpublished coins, which will appear in No. III of this year's Journal. In it he gives a gold coin of Sháhjahán II, of 1178 H., together with some interesting particulars, to which I would refer the members.

The name of this puppet king of Dihlí is Muhiyy-ul-Millat ('reviver of the faith'). He is the son of Muhiyy-us-sunnat ('reviver of the law'), who was the son of Prince Kámbakhsh. The latter was the favorite son of the emperor Muhiyy-uddín 'Alamgír (Aurangzib). In several histories and inferior MSS. Muhiyy-ul-Millat is confounded with his father. Thus Beale in his *Miftáh* says that the name of Sháhjahán II. was Muhiyy-us-sunnat; and Grant Duff (Histy. of the Mahrattas, Bomb. edit., p. 811) calls him "a son", instead of "a grandson" of Kámbakhsh.

But Muhiyy-us-sunnat could scarcely have been alive in 1178. He was born before or about 1100 A. H; for we know from the *Madáir-i 'Alamgírí* that he received in 1107 a *yaumíyyah*, or daily stipend, from Aurangzib, and that in 1114 he was made a Commander of 7000, with 2000 horse.

Muhiyy-ul-Millat was raised to the throne of Dihlí, under the title of Sháhjahán II.,* on the 8th Rabí' II, 1178, by Gháziuddín 'Imád-ul-Mulk (Mír Shihábuddín), who on the same day had murdered the emperor 'Azíz-uddín 'Alamgír II. This took place when Ahmad Sháh Abdálí invaded the Panjáb, and 'Imád-ul-Mulk had given out that the late emperor had carried on a secret correspondence with the Abdálí. 'Imád-ul-Mulk, after a short time, had to leave the newly made emperor in Dihlí, as Ahmad Sháh had advanced to the Ganges, and to seek a refuge with Súraj-Mall of Bhartpúr. Dihlí was then occupied by the Maráthas under Sadáshív Bháo, who for several months carried on negotiations with the Abdálí. It was with a view to detach Shujá'-uddaulah, the Nawáb-Vazír of Audh, from the invader, that the Bháo, on the 29th Çafar, 1174, deposed Sháhjahán II., appointing Mírzá Jawán-Bakht, son of Sháh 'Alam, regent for his father, and Shujá'-uddaulah Vazír of Hindústán.

On the 6th Jumáda II, 1174, Sadáshív Bháo was totally defeated by the Abdálí at Pánípat; and before the year was over, Ahmad Sháh had left India.

Muhiyy-ul-Millat, therefore, was titular king from 8th Rabí' II, 1178, to 29th Çafar, 1174. The histories do not say what became of him afterwards. In the list of Dihlí emperors he is generally left out, because he

* Rafí'-ud-daulah also had the title of Sháhjahán II.

was not recognized by Sháh 'Alam, the next emperor. 'Abdul-'Azíz 'Alamgír II had been killed on the 8th Rabi' II, 1173; and when the news reached his son Sháh 'Alam in Patna, he celebrated on the 4th Jumáda II. his *julús* in the neighbourhood of Patna. But Sháh 'Alam only received the insignia of royalty from Shujá'-uddaulah on the 16th Zil-Qa'dah at Sagáí Itáji, on the left bank of the Karamnáś; and the coinage was only settled a few days after the 19th Zil-Hajj, 1174, at Jájman, when the following legend was adopted—

سكه زد بر هفت كشور سايه فضل اله حامي دين محمد شاه عالم پادشاه

The shadow of God's kindness issued his coinage over the seven realms, the protector of the religion of Muhammad, Sháh 'Alam, the Emperor.

This verse (metre, *long ramal*) appears also on the early coinage of the E. I. Company.

General Cunningham's coin of 1174 may have therefore been struck at any time during 1174, as the coinage was in all probability continued after the deposition of Sháhjahán II.*

[Muáṣṣir-i-'Alamgír; Khizánah-i-'Amirah (under Alif); Muáṣṣir-ul-Umará (sub Gházi-uddin); Tahqirut-un-Názirín, by Sayyid Muhammad-ibn-'Abdul-Jalíl of Bilmgrám (sub annis 1173 et 1174); Siyar-ul-Mutaakhhirín; Táriḥ-i-Muzaffarí; Miftáh-ut-Tawárikh.]

I translate the following passage regarding Muhiyy-ul-Millat from the *Mukhtaṭar-i-Sair-i-Hindústán* by Hakím Wahíd-ullah—

'Muhiyy-ul-Millat, Sháhjahán II., son of Prince Muhiyy-us-sunnat, son of Mírzá Kámbakhsh, son of the emperor 'Alamgír, sat on the throne of the kingdom in 1173 after the emperor 'Alamgír II, as given in the following chronogram of his accession (metre, *muzára-i-akhrab*)—

مرزا محي الملّة ابن محي السنة بنشست چون بعظمت بر تخت گورگاني
سال جلوس هاتف گفت از سر هدايت والا نسب محمد شاه جهان ثاني

1. When Mírzá Muhiyy-ul-Millat, son of Muhiyy-us-sunnat sat in grandeur on the throne of the Timurides,

2. A voice from heaven for the sake of guidance said, 'Muhammad Sháhjahán II, of noble origin.'†

'It is known that when this king sat on the throne, Ahmad Sháh Durrání marched with a large army on Dihlí, and encamped near the Gházi-Hazárá, where he fought with Jhankú Ráo, the Maráṭha. He killed many leaders of the Maráṭhus. 'Imád-ul-Mulk had fled to Fort Kumbhír and

* For Ahmad Sháh Durrání's Indian coinage of 1173 and 1174, *vide* Proc. A. S., Bengal, for November, 1874, p. 208.

† The last *mizra* gives 1168; but the head (*sar*) of the word 'hidáyat', or *h. i. s. s.*, is to be added; hence we get 1173.

found an asylum with Mahārājā Súrāj-Mall of Bhartpúr. Muhiyy-ul-Millat reigned for about a year. In 1174 H., he was deposed during the invasion of Ahmad Sháh Durrání.'

The following papers were read—

- 1.—*On the Physical Geography of the Great Indian Desert, with special reference to the former presence of the Sea in the Indus Valley, and the origin and mode of formation of the Sand-hills.*—By W. T. BLANFORD, Esq., F.R.S.

(Abstract.)

This paper commences with a notice of the wide geological distinctions which exist between the peninsula of India and the surrounding regions, and after pointing out how long these differences have prevailed, how important the zoological peculiarities of India are, and how far they justify the conclusion that India was for a long period part of an Indo-African continent or land area, to which Australia at one time must have been united, the author proceeds to call attention to the importance of investigating the border regions between the Indian peninsula and the surrounding countries. ● These border regions consist mainly of the Indo-Gangetic plain in which all older formations, and all traces of geological action are concealed beneath the deep alluvial deposit, and it is only in a few localities that portions of these regions are free from the alluvial covering. The Indian desert between the Indus valley and Rájputana is such a tract.

A brief description is given of the physical character and zoology of the desert; it is shewn to consist of rather higher rocky ground about Jesalmír and Bálmír, and lower sandy tracts along the borders of Sind and towards Jodhpúr, especially in the Lúni valley. The northern portion of the desert has not been visited by the author, but it is said to be sandy throughout. A very large portion of the area consists of sand-hills, which, on the borders of the Indus valley, are arranged in long ridges running approximately from north-east to south-west, but elsewhere are less regular in form; they have, however, always a steep face towards the north-east, and a long slope toward the south-west. At first the desert might be taken for a plain of marine denudation, but the physical characters of the hills are opposed to this view; the scarps seen being of subaërial origin.

Between the sand-hills in eastern Sind are long pools of water known as 'dhandhs,' of considerable depth. Those to the westward, the water of which is supplied from the Indus valley, are fresh; to the eastward, where the water is supplied by percolation through the sand from the freshwater "dhandhs," it becomes saltier and saltier, until in some lakes salt and gypsum crystals are found. In some of the brackish water lakes a well known

mollusk *Potamides (Pirenella) Layardi*, H. Ad., was found living. This species is common in backwaters and salt lagoons on the Indian coast, and proves that the salt lakes in which it now lives were once in communication with the sea. It is probable that in geologically recent times a great inlet ran from what is now the Rann of Kachh up the Indus valley for a distance of ~~more~~ certainly more than 100 miles, and probably much further. The occurrence of great quantities of salt in the Lúni valley south-west of Jodhpúr, and the low elevation of the region point to the probability of another arm of the sea having extended in that direction, whilst it is possible that either from the south or north-west an inlet may have extended to the Sámbar Lake.

It is further shewn that the great accumulation of sand in two tracts, one along the edge of the Indus alluvium, the other in a belt running northward from the lower Lúni valley, also favoured the idea of former inlets of the sea in those directions, since the sand was originally in all probability derived from the sea coast, though a portion may have come from the Indus valley. The origin of the sand-hills is traced to the action of the south-west wind which blows with much force throughout the area in the hotter months of the year. The arrangement of the sand-hills in long ridges, *parallel* to the direction of the prevailing wind is shewn to be an anomaly difficult of explanation. Many of the sand-hills are of great antiquity and it appears possible that the long ridges may be due to a process of wind denudation, the intervening hollows having been swept clear of sand by the wind. The existence of sand-hills throughout the desert is simply the consequence of the want of any streams or rivers to wash the sand back again into the sea.

2. *Notes on the Inhabitants of the Nicobars.*—By F. A. DE ROEPSTORFF, Candidate of Philosophy, Copenhagen, Extra Asst. Superintendent Port Blair and Nicobars.

[Received May 12th. Read 5th July.]

It has for a long time been known that there existed in the interior of the island of Great Nicobar one or several inland tribes. They were constantly spoken of by the coast people and by the inhabitants of the other islands, but no European had ever seen them. Pastor Rosen, the Danish Resident at the Nicobars 1831-34, mentions them in his book on the Nicobars.*

Admiral Bille describes† how he, with some of the officers of the expedition in two boats, went up the Galathea river and came "to a place,

* Erindringer paa Ophold paa de Nikobarske Oer, &c.; Kjöbenhavn (Copenhagen) 1839. -

† Corvetten Galathea's Jordomsöiling; Kjöbenhavn 1849, vol. I, p. 342).

where the river formed a right angle, and where a big jungle-covered hill overhangs steeply the river. Behind this hill the river forms a little bay and in this we found three or four canoes fastened near land. We landed and climbed the hill slope. We found the place carefully railed off from the river side, and inside this rail, which enclosed the whole hill, lay 7 or 8 huts, but all were left by the inhabitants. On the hill slope lay a fallen log with its crown resting on the other side of the valley, where the canoes were lying, like a bridge in the air. From the care with which the place had been railed off, one might think that these poor savages were afraid of being attacked and had kept this line of retreat open." (This alludes I believe to the fallen log.) "But of whom were they afraid? who were their enemies? Captain Aschland, who had visited the same spot the day before, had found, that it had been just evacuated, that fire was still burning on their cooking places; they could not possibly know of our approach—so that it could not be us they feared. It was hardly either against the coast people that they wanted to defend themselves, for it was quite apparent that these two peoples, although they live in the same island, which is only 28 miles long and 12 to 16 miles wide at its very broadest, were quite ignorant of each other, so that the coast people spoke of the inland tribe as very forest-demons, who lived in the trees, eat frogs and snakes, which they caught by supernatural means, and altogether resembled very much the animals whose name they gave them, namely Orang-utangs. They assured us that they had neither houses nor canoes and now the first things we met were canoes and houses. Against whom were they thus keeping on the defence? Was it possible that war with its wretchedness had found its way into the centre of the jungles of this little island, and that the couple of hundred people who live here, should try to destroy each other in this little place? All these questions and conjectures thereon forced themselves on our minds as we wandered about in this little deserted village, whose only inhabitant we found enclosed in a sort of prison formed of a couple of logs with sticks between. It was a pig who seemed famished, and to judge from this fact, the inhabitants had probably not been there for several days. That this establishment had recently been formed was evident from the fresh state of the palisading and the poles on which the huts rested. We all agreed that the inhabitants must be in a higher state of civilisation than our friends the coast Nicobarese would allow to the forest-people. It is true that the huts were the most wretched specimens we yet had seen, there was hardly space for two people to sit in them, much less to lie in them, but yet they were huts, and built on the same principle as those of the coast people, namely, raised from the ground on poles, which mode of construction is however always used by Malays when in swampy places. Several were merely small sleeping-platforms, with one side against the trunk of a

tree and over which for protection were spread dhunny and rattan leaves or sheets of bark for roofing. Such a sheet of bark also formed the substance of their cooking pot which stood on a stand formed of four little sticks with cross sticks, under which the fire was laid. . . We found some wooden spears and some pieces of cloth pressed from the cettis bark, but they were very ragged. On the ground were thrown some used caldora fruits and in one of the huts we found a piece of prepared pandanus bread. Finally we found in the forest, close to the railing, a big tree that had newly been felled, from which we concluded that their tools must be pretty good. Everything seemed to show that the inhabitants of this establishment were of the same kind of people as the coast Nicobarese."

I hope I may be excused this long citation, but in it is contained the only information that existed regarding these inland tribes. No one had ever seen these people; but of their existence there could be no doubt. The conclusion by Admiral Bille that these people were something like the coast people, was however not adopted. Wallace, in his exhaustive work on the Malay Archipelago, includes the Nicobars in the Archipelago and concludes that there are nigritos at Great Nicobar. Professor Owen, F. R. S., when addressing the ethnological section of the Congress of Orientalists in London, 1874, says that fragments of the dwarf Nigrito stratum may be picked up—at the Nicobar Isles. When such an authority in science as Prof. Owen, believes this, and Wallace, the great traveller of these parts, supposes that Nigritos are found here, it is time that this error should be corrected. Wallace meets Nigritos in the Malay Archipelago, Jagor describes them in the Philippines and further north are found the Andamanese, so it would form a link if they were also found in Great Nicobar. From an intimate knowledge with the Andaman islands I became quite convinced that no tribe of Nigritos in the same stage of existence (I dare not say civilisation) as the Andamanese could exist in the Andaman jungles. The Andamanese live quite close to the sea and wander along the shore getting their subsistence in shell fish from the coral reefs and in fish from the sea. Quite subsidiary is their hunting the pig. The *Sus And.* has increased in number since fields of sugarcane and grain have sprung up near the Settlement, but even now they are scarce at certain seasons and could never be relied on to supply a steady and regular subsistence; and beyond the wild hog there is very little else to feed on. A few sour berries and perhaps eatable roots, but this latter I do not believe. The state of the jungle being such, I was a couple of years ago astonished at hearing it proclaimed that there should be an *inland* tribe quite close to the Settlement at Port Blair. Thousands of runaway convicts have trodden all over the jungles, and there is not, I believe, a spot where these luckless travellers have not been. Starvation brings them back and of all those that have returned, not one

has brought a tale of such an inland tribe. This alone would make it very improbable that such a tribe did exist, but it appeared to me that there was also the objection to this tale, that they must necessarily live near the fresh water streams and every one of these have been visited by the coast people. They were called Jaruwallahs, which is a Hindustani word for sweeper. I never for a single moment believed in this tribe and it turned out to be a fable. In later reports the name was changed to Jarudawadahs, this being simply an Andamanese dress for their old name.

The district in which it was supposed that this fabulous inland tribe lived was shifted constantly and I began to believe that the whole affair was an invention, until at last the matter was investigated by Mr. Tuson, who told me that there was a little tribe, not friendly to our Andamanese, which lived on the southern sea-border of S. Andaman. Thus the theory of an *inland* Andamanese tribe of Nigritos was exploded.

At Great Nicobar, on the other hand, it was quite certain that one or several inland tribes existed, and I became quite convinced from my experience at the Andamans that whatever sort of people they were, they must live in a different way from our Andamanese, who yet live on the Kjökkenmiddinge stage. Then, in 1872, I was visited at Nancowry by some men of the coast people from Great Nicobar. Among them was a youth who had been, so they assured me, one of the inland tribe and had as a little boy come to the coast, where he had remained. At times he still met his mother in the jungle but did not intend to return to his people.

This Shombong,* so these people are called, was fairer than the other men and had small Mongolian eyes. He had quite a different appearance from his friends and reminded me at once of the people of Schowra, a little island to the N. W. of Nancowry. The inhabitants of Schowra are also in a very peculiar isolated position, on which I will later on have more to say. This Shombong knew a little of the language of his tribe, and with a great amount of coaxing I got him to give me a few words. It was, however, getting dark and he was very frightened, so I had to let him go and thus I lost a chance of learning what I was so anxious to know. In a short vocabulary of mine of the dialects of these islands, I mentioned this strange visitor and what my conclusions were, but as the work was printed for official circulation the fact did not gain much publicity. It will be understood that I was anxious to visit the Great Nicobar and see these people myself. As there is the possibility of my not coming here again on duty, this one term was likely to be my last chance, and although I would not wish to visit these islands again, yet I should have left them with regret if I had not solved the mystery that was hanging about these inland tribes. I

* Shom means tribe, *c. g.*, Shom Pu = Car Nicobarian.

therefore early in April started southwards and arrived at Pulo Condul on the morning of the 5th. I was very well received and took the occasion to tell my wish to my hosts. Their lively faces changed at once, and they declared that it was quite impossible. I then told them, that if it could not be done of course I would have to give it up, but that I in no way intended to stir from the house until I had seen and talked to a Shombong. My people then agreed to try. It so happened that just at this time a father with his son were down at the coast to get some tobacco from the coast people, but these two lived six miles away in a lonely and out-of-the-way swamp. All declared that they would run away if I came unawares upon them, so two men were sent off with a present of tobacco to them and to prepare them for my coming. After allowing them a start of two hours we followed, and as it was a very hot and calm day, the six miles went very slowly, but amongst other things I tried to elicit from my guides something about these people. They told me that the Shombong ate monkeys, that they devoured the python snake, and in fact any animal food they could get. That they, some twenty years ago, before a great earthquake that took place about that time, had lived a few miles from the coast opposite to Condul on Great Nicobar, but they then got into some difficulties with the coast people, and moved away further inland to some far off hills. They showed me both places from the sea. That there were three tribes. One at this (the north) end, one on the west coast and one south, on the Galathea river. That the one tribe on the west coast was now very sociable, and that I could easily visit them, as they were not afraid of foreigners, but would even go on board the Malay ships for tobacco. That the men went quite naked when at home and the women wore a short skirt of a cloth pressed from cettis bark, which the Shombongs make. That the Shombongs have fine gardens in which they cultivate yams and other roots. That they had no cocoanuts because the monkeys destroyed them, and that they in fact had objections* to cocoanuts.

That they married one man one woman and that marriage was always for life. This is, however, not the case with the coast people where marriage is quite voluntary and can be broken off at any time. That none of the coast people had ever been to their place, and that in fact they would die if they did on account of the fever and evil spirits. That the Shombongs had great power over the elements, and had very powerful sorcerers among them. That they were very fond of glass beads, but would not have such big beads as the coast people wore, only small ones.

At last we arrived at the Ganges harbour where there were many traces of the earthquake they had spoken of, for a whole piece of land had sunk

* The expression used was *tjuit* (*tjit*), which means religious or superstitious objections.

into the sea. There were still some rotten logs standing out of the water, but these were nearly quite eaten through, and in another year I expect that this dead forest will be gone.

It was low water when we arrived, and we found the canoe of the men that had gone before us, hauled up on some rocks near the innermost part of Ganges harbour. There one man and I got out and waded along the swamp towards our Shombongs. At last we approached a little open hut where the people that had gone before us were sitting. When we came up to them, they said that the two Shombongs had just before run into the jungle and that they were quite close by. The Nichabarese had insisted on my wearing a red cloth over my coat, so as not to frighten them, but yet they had fled. My disappointment was very great, and my guide advanced into the jungle and called out to them. He turned to all sides calling and after a little while we heard a reply. A long parley followed and I sent one man more to try and persuade them to come in. After a little while my guide called out to me to come quickly and to bring the presents I had brought. I ran off as quickly as I could, with my presents in my hands, and very soon I met my man. He was on the other side of a little running stream and came over, but appeared very much frightened, so my guide gently led him off to his hut and very soon I joined them. He stood leaning against a tree and was watching every movement of mine, just like a wild beast, evidently afraid that I should throw myself upon him. My guide warned me to sit down and not to trouble him as he was afraid. So I sat down and began to write. He was a Mongolian, the small oblique eyes were quite a distinct feature in his face. His nose was bent, but flat below. His mouth was not so prominent as is found with the coast people. His teeth were small and well-formed, but black. He was 5' 8½" high. His hair and eyes were black. The hair was hanging wildly down his face, cut off just above the eyes, (the coast people have brown eyes). His forehead was high and well-formed, his ears not very big but bored. His legs were short and his feet and hands small. He was a good deal fairer than the three coast people present. He wore a string round his waist but badly tied, evidently put on for the occasion. After a little while we got into a conversation. He told me that his people did not eat either monkeys or the python, but lived on the produce of their gardens. That they had large plots under yams and Gunya. That they would also eat birds when they could get them. That they snared ducks and pigeons. That they did not use bow and arrows, but spears. That the men went naked but that their women had little skirts of the cettis-bark. I enquired what sort of cooking pots they had, and he declared that they had none, but boiled their food in vessels made of the arca-bark, and as a proof he showed me his last meal. He had been eating a couple of paddy birds (*Demigretta sacra*).

I wanted him to take me to his place, but though he seemed half willing, my guides made him afraid, and he stoutly refused, but promised that he would go to his village and fetch me some spears, some cloth and also some of the produce of their gardens. He said he could not do it in less than four days; and so four knots were tied on two sticks, he got one and we one.

While we were talking, a pig walked up and he told me that this pig had followed him, like a dog would follow us, all the way from his home and went wherever he went. We then left, and in consequence of our arrangement I had to wait four days before I could commence my return journey. On the 4th day we started north for little Nicobar, but I called in at his place. It was highwater and the canoe went close up to his little hut. I saw his pig in the old place and he was there. He brought me a magnificent yam from his garden and some other vegetables, three spears, of which one was made wholly of the wood of the *areca palm*, and a piece of cloth. He told me that he had asked his people whether I could visit their place and that they were willing to allow me to come if I would bring my wife. I gave him some presents for his wife, himself and his brother, who had come down this time with him. His brother was a little half-grown lad, who had his hair in the same way falling down over his forehead. I could not do anything more in the matter, and after a little talk we parted.

The result of my visit, I think, will be found to be, that the tribes that live in the interior of Great Nicobar are Mongolians and not Nigrites, that they subsist by cultivating land, that they have wooden spears and use the cettis cloth. They have no cooking pots but boil their food in vessels made of bark.

This tallies in every detail with the description of the village seen by the members of the Galathea expedition. My information was got from the tribe in the northernmost part of Great Nicobar; the village they saw was right south, on the Galathea river, so that I do not think that there can be any doubt that these are the same people, although belonging to different tribes.

Before concluding, I would beg to call attention to another circumstance. The coast people and the Nancowry people are the same in appearance, language, customs and ways of living. These people are *par excellence* fishermen. They delight in fishing and all other work gives way to this passion. It is true that they cultivate land at Nancowry, though not at Great Nicobar, but that is quite a subsidiary means of support. When they make gardens, they only consist of little patches. Not so with people of Schowra. This little island is inhabited by a strong-built fair race of Mongolian origin. They live by cultivating the soil mainly, and by supplying the other islands with cooking pots. As fishermen they do not do much and their spears are only small imitations of those used by the Nancowry people. Their language

is quite different in root and construction from the other dialects, and their women do not use cloth as the Nancowry tribe, but fringed belts made of cocoanut leaves. This tribe and the Shombongs are possibly the remains of a race of Mongolians, who were peaceably settled on the Nicobar Islands, cultivating the land and perhaps in a higher state of civilisation. They were perhaps attacked by the Malay race that is now living on the Nancowry group. They were driven away from the fertile alluvial soil which they cultivated and had to take refuge on the sterile Island of Schowra (there is no fresh water on Schowra) which they by care have made into a lovely garden. It resembles a park. Every available spot is cultivated and well kept. Some of this tribe were driven south, and took refuge in the interior of Great Nicobar where they, shut off from the outer world, lead a miserable existence, still tilling the soil as did their forefathers.

I have collected a great many words of the language of the Schowra people, but not very many of the inland race of Great Nicobar, not sufficient to ascertain by comparison, whether their languages might not be closely related.

But I think it will be found that the (Shom) Tatat of Schowra and the (Shom) Bong of Great Nicobar are the remains of what was once one people.

MR. W. T. BLANFORD thought that Mr. de Roepstorff was misled by his experience of the Andamanese when he supposed that a Nigrity tribe would have any difficulty in supporting itself away from the coast. Possibly the Andaman islanders might starve under such circumstances, but it is certain that Nigrity tribes are found far from the sea in the interior of the great Malay islands. They unquestionably exist in New Guinea, and almost certainly in the interior of Borneo, and they are said to be found in the Philippines and in the interior of the Malay Peninsula. It is very difficult for a civilized human being to understand how savages live, or even to conceive what a marvellous variety of animal and vegetable productions, on which savage man, at any rate, can subsist, are to be found in the forests of all tropical regions. Mr. Blanford believed that man could certainly find food wherever monkeys could exist.

The reading of the following papers was postponed—

1. On the physical explanation of the Inequality of the two semi-diurnal Oscillations of Barometric Pressure. By HENRY F. BLANFORD, Esq., *Meteorological Reporter to the Govt. of India.*
2. The *Cyclostomaceæ* of the Dalla Hills, Assam. By Major H. H. GODWIN-AUSTEN, F. R. G. S., F. Z. S., &c., *Depy. Supt. Topographical Survey of India.*

3. Description of *Botryodon*, a new Genus of *Muridæ* from Sind. By W. T. BLANFORD, Esq., F. R. S.

4. Description of Ancient Dwellings and Tombs at Sut Kagen Dor and Dhamba Koh, near Gwádar in Makrán, Balochistán. By Capt. E. Mockler, *Political Agent, Gwádar*.

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The following additions have been made since the Meeting held in May last.

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Heft. III und IV. *Dr. S. Landauer*.—Die Psychologie des Ibn Sinā. *Th. Noldeke*.—Zur Topographie und Geschichte des Damascusischen Gebietes und der Haurāngegend. *O. Buhlingk*.—Das Verhalten der drei kanonischen Grammatiker in Indien zu den im Wurzelverzeichnis mit *ah* und *u* anlautenden Wurzeln. *S. Goldschmidt*.—Bildungen aus Passivstämmen im Prākṛit.

**P. Zingerle*.—Ueber das syrische Buch des Paradieses von Ebedjesu, Metropolit von Nisibis. *R. Kohler*.—Die Pehlevi-Erzählung von (tscht-i-Fryān) und der kurgisische Büchergesang "die Lerche." *Jr. Ign. Goldziher*.—Abū-l-Alā al-Mu'arri als Freidenker. *C. Rice*.—An Besitzer der Bomlmayer Ausgabe des Mahābhārata und der Calcuttaer Ausgabe der Siddhānta-Kaumudi.

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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR AUGUST, 1876.

The monthly General Meeting of the Society was held on Wednesday, the 2nd August, 1876, at 9 o'clock, P. M.

Mr. W. T. Blanford, F. R. S., Vice-President, in the Chair.

The following presentations were announced—

1. From Mr. O. Semper of Hamburg, a copy of "Archiv des Vereins der Freunde der Naturgeschichte in Meklenburg."

The CHAIRMAN said that Mr. Semper, in sending this donation, had expressed his wish to receive papers relating to Shells, Mollusca and the geographical distribution of animals and plants.

From Capt. J. Waterhouse, a series of 14 photozincographed plates of Inscriptions from Gaur and Panduah.

Mr. BLOCHMANN said :—

The plates presented by Capt. Waterhouse to the Society are a set of photozincographs taken by him of inscriptions from Gaur and Panduah, the old Muhammadan capitals of Bengal. The originals of the plates were the rubbings which had been sent to the Society by General Cunningham, C. S. I., and Mr. E. V. Westmacott, C. S., and had been published with translations in the Journal for 1872, 1873 and 1874. The plates, it is hoped, will be published in the forthcoming work on Gaur by the late Mr. Ravenshaw.

The following is a list of the inscriptions—

Pl. I. Two Inscriptions from the Adinah Mosque, Panduah, built by Sikandar Sháh, A. D. 1369. Published, Journal, 1873, p. 257.

The inscriptions are most artistically cut.

Pl. II. Inscription No. 4, from Hilál's Mosque near the Fort of Máldah. Mahmúd Sháh I., A. D. 1455. Journal, 1874, p. 294.

Inscription No. 5, from the Chhotá Dargáh at Panduah. Mahmúd Sháh I., A. D. 1459. Journal, 1873, p. 271.

Pl. III. Inscription No. 5, from a Mosque at Panduah. Yúsuf Sháh, A. D. 1479. Journal, 1873, p. 276.

Pl. IV. Inscription No. 6, from a Mosque at Gaur. Yúsuif Sháh, A. D. 1480. *Journal*, 1873, p. 277.

Inscription No. 7, from a Mosque at Gaur. Fírúz Sháh II., A. D. 1489. *Journal*, 1874, p. 299.

Pl. V. Inscription No. 8, from a Mosque near Máldah, Fírúz Sháh II. *Journal*, 1874, p. 299.

Inscription No. 8a., from a Mosque at Gaur. Mahmúd Sháh II. *Journal*, 1873, p. 289.

Inscription No. 9, from the Chhotá Dargáh at Paṇḍuah. Muzaffar Sháh, A. D. 1493. *Journal*, 1873, p. 290.

Pl. VI. Inscriptions Nos. 10 and 11, from Máldah. Husain Sháh, A. D. 1494 and 1495. *Journal*, 1874, p. 302.

Pl. VII. Inscription No. 12, from Husain Sháh's Madrasah at Gaur, A. D. 1502. *Journal*, 1874, p. 303.

Inscription No. 13, from a Gate at Gaur. Husain Sháh, A. H. 910. *Journal*, 1874, p. 304.

Pl. VIII. Inscription No. 14, from Husain Sháh's Mosque at Gaur, A. D. 1505. *Journal*, 1873, p. 294.

Inscription No. 15, Husain Sháh, A. D. 1505. Not published.

Pl. IX. Inscription No. 16, from Shaiikh Akhí Siráj's tomb at Gaur. Husain Sháh, A. D. 1510. *Journal*, 1873, p. 294.

Pl. X. Inscriptions Nos. 17 and 18, from a Gate and a Mosque at Gaur. Husain Sháh, A. D. 1510 and 1512. *Journal*, 1873, p. 294, and 1874, p. 305.

Pl. XI. Inscriptions Nos. 19 and 20, from a Gate of the Fort of Gaur and Daulat Názir's Mosque near Máldah. Husain Sháh, A. D. 1512 and 1517. *Journal*, 1873, p. 295, and 1874, p. 305.

Pl. XII. Inscriptions Nos. 21 and 22, from Máldah. Nuçrat Sháh, A. D. 1524 and 1528-29. *Journal*, 1874, pp. 306, 307.

Pl. XIII. Inscription No. 23, from the Qadam Rasúl at Gaur. Nuçrat Sháh, A. D. 1530-31. *Journal*, 1872, p. 338.

Pl. XIV. Inscription No. 24, from a Mosque near Máldah. Nuçrat Sháh, A. D. 1531-32. *Journal*, 1874, p. 308.

Inscription No. 25, from a Mosque at Sa'dullahpúr, Gaur. Mahmúd Sháh III, A. D. 1534-35. *Journal*, 1872, p. 339.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members—

J. Hector Esq.

Major O. B. St. John.

P. T. Carney, Esq.

The following are candidates for ballot at the next meeting :—

Dr. H. Cayley, proposed by H. F. Blanford, Esq., seconded by W. T. Blanford, Esq.

Major M. M. Bowie, Madras Staff Corps, Dy. Commr., Sambalpur, proposed by J. Wood-Mason, Esq., seconded by W. T. Blanford, Esq.

Mr. George A. Grierson, C. S., Rangpur, proposed by the Rev. Dr. K. M. Banerjee, seconded by H. Blochmann, Esq.

Mr. H. Beveridge, C. S., proposed by H. Blochmann, Esq., seconded by Capt. J. Waterhouse.

The CHAIRMAN, on behalf of the Council, made the following statement regarding the correspondence published in the Introductory Note to Mr. C. B. Clarke's "*Compositæ Indiæ*."

"With reference to the correspondence, and remarks thereon, published by Mr. C. B. Clarke as an Introductory Note to his recent work on '*Compositæ Indiæ*,' the Council of the Asiatic Society deem it right to inform the Society, that Mr. Clarke's paper was declined on grounds which seemed to the Council least hurtful to Mr. Clarke's feelings, although, unfortunately, the opposite effect was produced. Mr. Clarke's statement as to the cost of the extra number of the Journal containing the Blyth Catalogues having been largely provided by Mr. Blyth's friends is entirely erroneous. The only portion of the expense which was not paid by the Society was the photographic portrait of Mr. Blyth, which was presented to the Society by Mr. Loder, a relative. With this explanation the Council express their deep regret at the misunderstanding between themselves and a valued member of the Society."

The CHAIRMAN laid before the Meeting the following Memorandum drawn up by the Council with reference to the arrangements they had finally made for the repairs and improvement of the Society's premises.

Memorandum on the Proposed Alterations and Repairs of the Society's Premises.

At the General Meeting of the Society in April, the Chairman announced that it was the intention of the Council to employ part of the money received from Government, in thoroughly repairing and improving the Society's premises.

There has been more delay than was anticipated in completing the arrangements; but the Council have decided that the following works are necessary; and as it was most desirable that they should be completed before the end of the recess, or as soon as possible after it, they have given orders for their being carried out, and they are now in course of execution by Messrs. Mackintosh, Burn and Co.

1. The house to be thoroughly repaired inside and out.
2. The rooms on the ground floor to be laid with asphalte. The passages about the entrance and staircase to be paved with Chunar stone.
3. Two rooms on the ground floor to be converted into a retiring room and lavatory for the convenience of Members.
4. The sky-light over the staircase to be enlarged and improved.
5. The meeting-room and the rooms round it to be coloured.
6. The floors of the three rooms, proposed to be devoted to the Library, to be propped up from below by iron pillars.
7. The staircase to be improved by the substitution of iron railings and a substantial mahogany hand-rail for the present ones.
8. The present portico, being very narrow and inconvenient, to be demolished, and a new enlarged portico to be built symmetrical with the entrance doorway, to which a new entrance door is to be put.
9. Gas to be laid on in the entrance and public rooms.

The cost of these repairs and alterations will be—

General repairs and alterations, including asphalte for lower floor, fitting up retiring room, enlarging sky-light, propping up Library rooms, colouring meeting-room, and other minor items,.....Rs. 8,980

Alterations to Staircase, 1,480

New Portico and Entrance-door, 3,150

13,610

Gas and Fittings,..... 2,342

Total, Rs. 15,952

Messrs. Mackintosh, Burn have undertaken to execute the works included under the first three items for Rs. 13,000, so that the total cost will thus be reduced to Rs. 15,342.

Besides these repairs and alterations which are necessary and urgent, the Committee of Repairs have recommended that the present boundary wall and godowns in Park Street should be demolished, and replaced by a neat half-wall and iron railing with two gateways and a durwan's lodge, a new range of servants' houses and latrine being built at the back of the house from the old materials. The cost of these alterations and additions is estimated by Messrs. Mackintosh, Burn at Rs. 6,167.

There is no doubt that these proposed alterations of the boundary wall would be an immense improvement to the appearance of the Society's premises, and as the present boundary wall is in a very bad state, the godowns inconvenient and useless, and there would in any case be the expense of repairing them, which is estimated at Rs. 857, the Council consider that it

would be desirable to carry out the changes proposed by the Committee ; but before deciding to spend so much money upon the mere improvement of the Society's premises, they feel themselves bound to refer the question for the vote of the general body of Members.

The Committee of Repairs have also recommended that one or two shops should be erected in the vacant corner of the compound, at the junctions of Park Street and Chowringhee. This could be done at a cost of about Rupees 12,000, and as the site is a most favourable one for such a purpose, there is little doubt that a regular income of between Rs. 200 and 300 a month would be realised, (an offer of Rs. 200 has already been received,) and that the erection of the shops would be a highly advantageous investment of part of the Society's capital.

If the shops were erected, there would be a reduction of about Rs. 1,000 from the cost of the boundary railing.

The ground on which it is proposed to build the shops is quite useless to the Society, except as a piece of garden, and it is so situated that it could be cut off without any inconvenience, nor would the presence of the shops interfere in any way with the perfect privacy of the Society's premises.

In this case also the Council feel that, although the proposed investment would no doubt be advantageous, they cannot act without the consent of the general body of Members, and they therefore propose to circulate this memorandum to all Members of the Society, for confirmation of their action with regard to the urgent repairs and alterations, and for their vote with regard—

I. To the erection of a dwarf wall and railings, and new servants' houses in place of the present boundary wall and godowns, at the estimated cost of Rs. 6,167.

II. To the investment of a portion of the Society's capital in the erection of a shop or shops, on a waste part of the Society's compound, at a cost of about Rs. 12,000.

These questions will be brought up for discussion at the November Meeting.

Should all these proposals be adopted, the total cost of the alterations and repairs will be about Rs. 83,000 ; but of this sum Rs. 12,000 must be looked upon in the light of a reproductive investment, so that the amount actually sunk in repairs will be Rs. 21,000, a sum well within that estimated and allowed for the purpose, when the question of the compensation to be given by Government to the Society for its rooms in the New Museum building, was considered.

Besides the above expense for repairs, there will be some further expenditure, estimated at between Rs. 5,000 and 6,000, for repairing the pic-

ture frames, new mats, punkahs, book-cases, furniture, &c., but the Council believe that this may be met in great part from income without trenching further on the vested capital of the Society.

It will thus be seen that the total expense of all the proposed repairs and alterations of the buildings and the further cost of furniture &c., is not likely to exceed Rs. 40,000. The amount of the Society's funded property at the present moment is Rs. 1,58,000, besides about Rs. 6,000 in floating account, so that should *all* the proposed improvements be adopted, there will remain to the Society at least Rs. 1,20,000 invested in 5½ % Government Securities and bringing in a regular income of nearly Rs. 550 a month, quite independently of subscriptions, besides 4 or 5,000 rupees available for the general purposes of the Society. Should the shops be built the income will be increased to at least Rs. 750, and if they are not built, to a little over Rs. 600.

The Council would take this opportunity of expressing their indebtedness to Mr. R. R. Bayne for the valuable professional assistance he has rendered to the Society, as a member of the Committee of Repairs, and particularly for the trouble he has taken in preparing detailed plans and estimates for the improvements proposed by the Committee, though the Council regret that they have been unable to carry out Mr. Bayne's beautiful designs, on account of the extra expense they would have involved.

The CHAIRMAN announced that as the stock of copies of the Rules of the Society was nearly exhausted, the Council proposed to publish a revised edition and had, with the assistance of a Committee, drawn up a circular showing the changes and additions it was thought desirable to make, with a statement of the reasons for the alterations proposed. The circular would be sent to the whole body of members, as provided under Rule 32 (c), and the question would come up for decision at the November meeting.

The following were the changes proposed—*

RULE 1. *Proposed Alteration.*

Name and Object.

The Society shall be called, as heretofore, the ASIATIC SOCIETY OF BENGAL, and its objects shall be those described in the following language of the Founder, Sir William Jones :—“The bounds of its investigations will be the geographical limits of Asia, and within these limits enquiries will be extended to whatever is performed by man, or produced by nature.”

* Additions and changes are shown in italics.

RULE 2. *Proposed Alterations.*

Constitution.

2. *The Society shall consist of Members of the three following classes :—*

(a) Ordinary Members, the number of whom shall be unlimited, and who shall be designated as *Resident Members*, if they permanently dwell in Calcutta, or within 80 miles thereof ; as *Non-Resident Members*, if they permanently dwell *within the limits specified in Rule 14 D* ; and as *Foreign Members*, if they live permanently beyond those limits.

(b) As at present.

(c) As at present.

Proviso.—As at present.

3. Persons of all nations shall be eligible as Members of the Society.

4. *The administration, direction and management of the affairs of the Society shall be entrusted to a Council composed of the Officers of the Society, namely : a President, three Vice-Presidents, and one or more Secretaries, including the Treasurer, with as many other ordinary Members as shall with these officers make up a total of fifteen.*

RULE 3. *Proposed additional Clause.*

Should there be no meeting during the recess months of September and October, the Council shall be empowered to elect candidates for ordinary Membership, who shall have been duly proposed and seconded at the Meeting of the Society in August, or whose names may be received as candidates during the recess. Such candidates shall be ballotted for at the Meeting of the Council next succeeding that at which their names and those of their proposers and seconders shall have been laid before the Council ; and during the interval between the two meetings these names shall be suspended in the Society's meeting Room as provided in Rule 3 ; and it shall be necessary for the due election of such candidates, that not less than two-thirds of the Members of Council present at the meeting shall vote in their favour. Such elections shall be reported and confirmed at the first general meeting of the Society after the Recess.

RULE 5. A. B. C. *Proposed Alterations.*

5. A. As at present.

B. No person, although duly elected according to the foregoing Rules, shall be entitled to exercise the rights and privileges of Membership, nor shall his name be entered in the list of Members, until he has paid his admission fee *and first quarterly subscription.*

C. As at present.

The preceding three rules shall be written or printed on the letter of announcement of election sent to Members by the Secretary under Rule 4.

RULE 9. A. *Proposed Alteration.*

9. A. The subscription of Resident Ordinary Members shall be Rs. 9* per quarter.

PROPOSED RULES FOR COMPOUNDING,

to be added after Rule 9.

I. *Any member of the Society may, after he shall have paid his entrance fee, compound for the payment of all future subscriptions as a non-resident member, by the payment in a single sum of Rs. 300.*

II. *Any member already belonging to the Society may at any time compound for his future subscriptions as a non-resident member by the payment of the above compounding fee, less Rs. 10 for each full annual subscription, of not less than Rs. 24, he may already have paid, whether as a Resident or non-Resident member. Provided always that under no circumstances shall the composition be reduced below Rs. 100.*

III. *Resident members who have already compounded for their non-resident subscriptions under the last rule, shall still be liable to pay a quarterly subscription equal to the difference between the Resident and non-Resident rates of Subscription, during such time as they shall remain resident. Such additional subscription to be chargeable under the provisions of Rule 9 E.*

IV. *Any member who compounds for his non-resident subscription, or who has already compounded for it, may also compound for all future additional subscriptions as a Resident member by payment of a sum equal to 10 times the yearly difference between the non-resident and resident subscriptions.*

V. *Any member who has compounded shall be entitled, while absent from India, to the privileges specified under Rule 14 C (as amended).*

RULE 13. A. B. C. *Proposed Alterations.*

Cessation of Membership.

13. A. When any ordinary member shall have omitted to pay the subscriptions of six successive quarters, the Council shall cause a registered letter to be sent to him, directed to his last known address, informing him of

Striking off Member's
name for non-payment
of arrears.

* It is now Rs. 12.

the amount of the sums due by him and that unless they are paid within six months from the receipt of such letter, his name will be struck off the list of Members.

B. If he omit to pay the amount within the time so limited his name shall be suspended as a defaulter at any Ordinary General Meeting and, unless the amount be paid in the meantime, shall remain so suspended within the Society's building till the next Ordinary General Meeting when the Chairman shall declare such Member to be removed from the Society for nonpayment. This fact shall be notified in the Proceedings of the Society.

Clause C. will remain as it is.

RULE 14. A. B. Proposed Rules.

In the event of an Ordinary Member leaving India, and of his informing the Secretary by letter that he desires to retain his privileges as an Ordinary Member under Rule 7 (b), his subscription shall be Rs. 16 per annum, or 32 shillings, whilst absent from India. On the return of such member to India he shall thereupon become liable to pay his original subscription as provided in Rule 10 B.

B. Any member leaving India may compound for all future subscriptions under the provisions of Rule 11 of the new rules for compounding.

Proviso.—These rules shall not apply to members who are now paying an annual subscription of Rs. 12 under Rule 14 A of the Rules of 1869, or who shall have compounded for their subscription under that rule.

C. Ordinary Members paying a subscription of Rs. 16 per annum under this rule shall not be competent to exercise the privileges specified in Rule 7 (e) and (g). Nor shall they have the right of voting under Rule 32.

D. For the purposes of this rule members in India shall be considered to include all those living in any part of India and its dependencies, including Aden, or in Ceylon and the Straits Settlements, or elsewhere between the parallels of 60° and 100° E. Longitude, and from the Equator to 40° North Latitude. Members beyond these limits shall be considered Foreign Members.

E. Same as present rule B.

RULE 15. Proposed Rules.

Any Member may withdraw from the Society by signifying his wish to do so by letter addressed to the Secretary.

Any member who shall cease to be a member of the Society either by

forfeiture of his claims under rules 13, 14 B. and 18, or by voluntary withdrawal shall continue liable to the payment of the quarterly subscription until he shall have discharged all sums (if any) due by him to the Society and shall have returned all books or other property (if any) borrowed by him of the Society; or shall have made full compensation for the same if lost, injured or not forthcoming.

RULE 20 to be cancelled.

RULE 22. (f). *Proposed Alteration.*

(f) To prepare and submit to the Annual General Meeting a Report on the general concerns of the Society. Such report shall set forth the income and expenditure for the calendar year, the balance in hand, the debts and assets, the estimated income and expenditure of the succeeding year, prosperity, or otherwise, of the Society, and the progress of the Library. The Report shall also include an Abstract of the Proceedings of the Council during the year.

RULE 22. *Proposed Additional Clause (g).*

(g) In conformity with the provisions of the Registration Act, No. XXI of 1860, (Sections 9 and 10,) under which the Society has been registered, the Council shall be empowered, subject to the sanction of an Ordinary General Meeting, to take legal proceedings under the Act for the recovery of any sums due by members who, after receiving due notice of their liabilities, shall refuse to discharge them.

RULE 26. *Proposed Additional Clause.*

At the expiration of every Quarter the Treasurer shall prepare a list of the names of those members who may be in arrears of their subscriptions for that or previous quarters and shall submit it for the orders of the Council at the Council Meetings next before the General Meetings in February, May, August and November.

RULE 28. C. *Proposed Alteration.*

(c) The business of each Meeting shall be proceeded with in the order hereinafter prescribed in Rules 29 and 30, Clause (c) : provided always that, on written notice being given to the President or one of the Secretaries, not less than 48 hours before the hour of Meeting, a motion for the immediate transaction of urgent business may be made; and if such motion be seconded and carried, this rule shall be suspended.

RULE 28. *Proposed Additional Clause after (c).*

With the exception mentioned in the last Rule, notice of motion on any matter of importance shall be given at the General Meeting preceding that on which the subject is to be disposed of, in order that members who take an interest in the question may have an opportunity of informing themselves regarding it and expressing their assent or dissent; and no motion of which notice has not been given shall be carried at the meeting at which it is proposed if the President or Chairman of the Meeting rules that it should be postponed.

RULE 29. *Proposed Alteration.*

The Society shall meet on the first Wednesday in each month excepting in September and October but the Council may, if they consider it desirable, appoint a meeting to be held as usual in one or both of those months.

RULE 32 (c). *Proposed Alteration.*

(c) When any proposal is made respecting expenditure to a large amount, changes of organization, disposal of securities forming part of the Permanent Reserve Fund, amendment or alteration of the Rules, or generally when any question arises which, in the opinion of the Council, should be referred to the whole body of Ordinary Members.

RULE 33 *Proposed Alteration.*

33. Any question referred to the votes of the whole body of Ordinary Members, shall be brought up at the Ordinary
 Manner of taking the Votes. Monthly Meeting next after the close of one month from the issue of the voting papers. Ordinary Members present at such Meeting, and who have not already sent in a voting paper, shall be permitted to fill in a voting paper at such Meeting. The Chairman shall appoint two Scrutineers, who shall proceed to examine the votes and report the result.

RULE 34. *Additional Rule proposed.*

Minutes of the Proceedings of every meeting of the Council shall be taken during their progress by one of the Secretaries, or, in the case of their absence, by some member present whom the Chairman shall appoint for the occasion. The minutes shall afterwards be circulated to the members present at the meeting for the purpose of ascertaining their correctness and then be copied fairly in a minute book and read and signed by the Chairman at the next meeting of the Council.

RULE 36 A to be cancelled.

RULE 38. *Proposed Rules.*

I. Of the Funds of the Society now invested in Govt. Securities, Rs. 1,20,000 shall be considered as a Permanent Reserve Fund for the benefit of the Society and it shall not be competent to the Council, or to any of the Society's Officers, or to any Committee of the Society to sell or otherwise alienate the said fund or any portion of it without first recommending the sale or alienation in question to the Society and taking the votes of the general body of Members, as provided in Rules 32 and 33, and further such sale or alienation shall only be lawful if carried by a majority of not less than three-fourths of the members who have voted. And should any portion of the Permanent Fund be sold or alienated by authority of the members of the Society the remainder shall be preserved under this rule in the same manner as if the sum were intact. But this rule shall not apply to the temporary investments in Govt. Securities mentioned in the following rule.

II. The remaining Funds of the Society shall be lodged in the Bank of Bengal in the name of the Society. Any surplus not required for immediate expenditure shall be invested from time to time by the Treasurer in the name of the Society as a Temporary Vested Fund; but no Government or other Securities forming part of this Fund shall be sold or otherwise disposed of by the Treasurer or any Officer or Committee of the Society except by special order of the Council.

III. Whenever the Temporary Vested Fund shall exceed the sum of Rs. 10,000 it shall be lawful to the Council, if they consider it desirable, to transfer such excess to the Permanent Reserve Fund, and the provisions of Rule I shall apply to these additions exactly as if they had formed part of the original sum.

IV. All sums received from Members as Admission or Compounding fees shall be regularly invested by the Treasurer as soon as possible after the receipt thereof, and only the interest accruing therefrom shall be considered available for the general expenditure of the Society. Such investments shall form, and be treated as, part of the Permanent Reserve Fund under Rule I.

V. All Securities and monies the property of the Society shall be lodged for safe custody in the Bank of Bengal.

VI. Cheques drawn on the Bank for sums in excess of Rs. 500, shall be signed by the Treasurer and counter-signed by a Member of Council.

PROPOSED NEW RULE (MISCELLANEOUS).

Alteration of the Bye-laws.

When the introduction of any new Bye-law, or the alteration or repeal of any existing Bye-law, is recommended by the Council, or proposed by ten or more ordinary Members, the Council shall cause to be sent to every member of the Society entitled to vote, a statement of the proposed changes and the reasons for them, with a view to the votes of the general body of Members being taken as directed in Rule 33. Provided always that no change in the Bye-laws shall be valid unless a majority of three-fourths of the Members who have voted shall be in favour of the proposed changes.

The COUNCIL reported that in conformity with the wish expressed at the last meeting Mr. H. F. Blanford's proposal, that the refund of subscription to the Piddington Fund should be devoted to form a nucleus of a fund for the pensioning of old and deserving servants of the Society, had been referred for the decision of the subscribers at present in India, and that of 17 members addressed eight had replied agreeing to the proposal.

The Council would therefore recommend that it should be adopted but with the proviso, that any subscriber who wished to reclaim his share should be at liberty to do so.

The proposition was agreed to unanimously.

The COUNCIL reported that in accordance with the vote passed at the last meeting, the Society had been registered under Act XXI of 1860.

Also that they had elected Dr. J. Anderson and Lieut. F. W. Jarrad, B. N., members of the Natural History and Library Committees.

The REV. FATHER LAFONT, S. J., exhibited one of Crookes' Radiometers and said that he had made numerous experiments to ascertain 1st, whether the rotation was due to the impulse of the ether wave, and 2nd, whether they were due to the longer or to the shorter waves, to Heat rather than to Light. Having tried polarized heat and light, he thought the very slight acceleration produced, when the plane of the waves was directed normally against the vanes, could not warrant the conclusion that the waves were the propelling agent. In his opinion, the result of his experiments on the second point was more definite and pointed to Heat as the principal moving agent. He might venture to say that the radiometer never moved except a change occurred in its temperature: if that temperature was increased, the little mill moved white faces forward; if it was lowered, it moved black faces forward, or in the reverse direction.

Father Lafont concluded from this that the radiometer was completely useless as a photometer. As to the real cause or causes of its movements, he thought the subject required further study before a definite answer could be given.

Mr. R. LYDEKKER exhibited a portion of the lower jaw of *Tetraconodon magnum*, Falconer, from the Sewálíks, and said—

The specimen exhibited is a portion of the lower jaw of this Hippopotamoid: the animal was previously only known by two upper molars obtained by Falconer. The present specimen contains two tubercular molar teeth, and two large conical premolars, the latter far exceeding in size the former; a condition unknown in any other mammal with which I am acquainted.

The specimen was obtained by Mr. Theobald during the present year from the Sewálíks of the Panjáb; it will be found described in the forthcoming number of the 'Records of the Geological Survey of India.'

Mr. W. T. BLANFORD exhibited some drawings sent to him by Captain E. Mockler, Political Agent at Guádar, representing ancient dwellings and tombs discovered by Captain Mockler at Sutkagen Dor and Damba Koh near Guádar in Makrán (Balúchistán). The originals had been sent to the Royal Asiatic Society with a full account of Captain Mockler's discoveries, of which a short notice was given to the meeting by Mr. Blanford who said:

The two localities explored by Captain Mockler, are not far from the coast of Makrán. The first of these, Sutkagen Dor (the burnt-up torrent, a name derived from the charcoal and ashes found in the neighbourhood) lies about forty miles north-west of Guádar: there is a modern stone fort constructed by Balúchis, but remains of ancient works also occur, the principal being two dykes of large stones joining different hills together. Such works are found in other parts of Balúchistan and are known to the inhabitants as "Bahmani."

Excavations at this place beside an ancient brick wall laid bare the walls of a small house, built of bricks, some of them vitrified, and sparingly cemented together with mud, and also of a stone house enclosing platforms paved with stone. This, Captain Mockler thinks, may have been a temple. Pottery, charcoal, bones, chiefly of fish, and flint knives were found both in the houses and in the soil around. A number of oblong stone enclosures were also met with, one wall sometimes above another and running in a different direction. Fragments of pottery, stone knives, bones and pieces of copper are abundant in these enclosures and below the foundations, and in several of them, earthen pots were discovered, about 2½ feet high,

containing earth, stones, bones, (occasionally charred) teeth, charcoal, and in one case a small stone knife. The contents, with the possible exception of the bones, appear to have been washed in by water. Besides the earthen pots, pieces of shell bracelets, stone cubes like large dice, stone and pottery heads, fragments of copper bracelets, grinding stones, and round stones like cannon balls were found in the enclosures.

About 40 miles west of Sutkagen Dor is a place called Damba Koh or Dambani Koh (the hill of dams, *i. e.*, cairns). A range of hills is covered with little square stone enclosures 8 or 9 feet square at the base, each having a single door which usually faces up the hill; a few, without apparent reason, have openings to the north, *i. e.* at right angles to the others. These enclosures were originally plastered over with mud and diminished in size above, but they are for the most part ruined and of many only a circle of stones remains. It is not clear whether these little enclosures were dwellings or tombs, but they were probably the latter. All contained earthen pots originally and much of the pottery is coated with a green glaze.

The country around the hills is a level of grey clay, and the hills consist of beds of similar clay tilted up and interstratified with limestone or calcareous sandstone, blocks of which are used for building. Two hills away from the main range are covered with ruins of stone houses built very close together. Most of these contained several rooms, each from 15 to 20 feet square. These ruins are probably the remains of the city, the inhabitants of which were buried in the "dams." Details of the construction of these houses are given in the paper. Pottery, beads, &c., were found and a coin with some Greek letters still visible. The forms of the pottery discovered are different from those now used in Balúchistán.

In the neighbourhood of one of the hills remains of a furnace were found which had apparently been employed for burning vitrified bricks. None of these were found in the houses, but it is supposed that a fine red earth which abounds is due to their decomposition.

Remains of another city called Darmáni bân exist 5 miles south-east of Damba Koh and consist of a number of large houses packed closely together on a solitary hill, and of "dams" on the hills around. The latter are not so well preserved as at Damba Koh. Here also the remains of a furnace were found. Forty miles south of Damba Koh at a place called Júní (or Júnri) there are more "dams", but they are, with rare exceptions, oval or circular, not square, and no door could be found, though one may have existed on the west side which is always more ruined than the others. These dams are on level ground, not on hills. In one a pot with bones was found, and some fragments of iron, in others pottery, stones for sharpening knives, copper bracelets, and in one case a copper lamp, cornelian beads, ornaments, a lot of decomposed iron and bones.

Six "damba" were also examined at a place called Jati, 6 miles from Guádar, three of these contained human bones alone, others contained besides bones, pottery, iron, &c.

Captain Mockler thinks that in all these dams the bones were collected after the body had decomposed, and were placed either in an earthen pot or on the ground, and that an earthen water pot and sometimes other pots, perhaps containing food, were added, as well as ornaments and weapons. No signs of cremation appeared, except at Sutkagen Dor, and at that place there are no dams and the houses were probably made by a different people. Captain Mockler concludes by saying that since his attention was first drawn to these antiquities, which have never before been noticed, he has heard of their occurrence in many parts of the country, and that he hopes to continue his researches into these and other remains.

Mr. BLANFORD added that the account appeared to indicate remains of two different ages, as in the sets of buildings at Sutkagen Dor flint knives were found and but little metal, whilst remains of iron implements and a Greek coin were found in those at Damba Koh. The remains of cyclopean masonry occur throughout Balúchistán, and the walls appear chiefly to have been built in order to form dams to reservoirs of water. The vitrified bricks mentioned are found at all old cities in Sind such as Arúr and Bráminabád.

Mr. WOOD-MASON exhibited specimens of a species of *Iapyx* which he had recently found amongst the decaying leaves and fungi at the foot of a bamboo-clump in his own garden at Calcutta, and said—

"This remarkable form of Arthropoda, which has not hitherto been met with in India or, indeed, in any part of Asia, is of the greatest interest as belonging to a group the members of which are considered by Sir John Lubbock to be the living representatives of a primæval form from which the great orders of insects have all originated. Discovered many years ago in Algeria by M. Lucas, the eminent French entomologist, *Iapyx solifugus*, the type of the group, was only made known to science in 1864, when Mr. Haliday described and figured it in the 'Transactions of the Linnean Society of London'; in the following year it was submitted to a more careful examination by Meinert, who detected a pair of rudimentary appendages on each of the seven anterior segments of the abdomen, just as in its allies, *Campodea* and *Nicoletia*, in which latter, however, all the abdominal segments appear to be thus furnished. Four species of the genus have already been described, viz., *Iapyx solifugus*, Haliday, from Algeria, Switzerland, and various parts of Italy; *I. Sauseurii*, Humbert, from Mexico; *I. gigas*, Brauer, from Cyprus; and *I. Wollustoni*, Westwood, from Madeira and an adjacent island. A fifth has now been discovered thousands of miles from the nearest

of these localities, in association with a large bright crimson-coloured species of *Anoura*, two species of Spring-tails, two or three *Pselaphidæ*, five or six myriopods, amongst which a *Polyxenus* differing from the European *P. lagurus* in having one instead of two pencils of silvery hairs at the end of the body, and a species of the very remarkable genus *Scolopendrella* especially merit attention.

Mr. WOOD-MASON next exhibited some remarkable species of *Mantidæ*, and said—

These insects belong to that division of the family in which either the legs or some part of the body is provided with appendages, and to that section of it in which in males as well as in females the antennæ are simple and setaceous and not pectinated, and I invite attention to some sexual differences presented by them which, I believe, have never before been noticed.

In *Hestias Brunneriana*, the head of the female is prolonged vertically in the form of a cone bilobed at its extremity, while in the opposite sex this great cone is represented by a mere tubercle, as in both sexes of the species belonging to the genus *Creobrotus*; the fore-femora, which are wanting in the specimen from which the species was described by Sausure, are equally conspicuous in both sexes, being very broadly oval, with their upper margins very strongly crested.

In the next specimen to which I would draw attention, a small (22 mm. long) female insect brought from Pegu by Mr. Kurz and apparently allied to *Hestias* and *Orypilus bicingulata*, DeHaan, the upper edges of the fore-femora are sharply crested, but not so greatly expanded; the cephalic cone is bicuspid at the extremity and armed with two pointed cusps on each side; the occiput presents behind each eye a pointed tubercle directed backwards; the face is carinate, the keel of the 'facial shield' terminating above in a stout conical tooth; the two upper ocelli are surmounted by a pair of long and slender conical spines; the organs of flight do not nearly reach to the extremity of the abdomen, and the disc of the prothorax is armed with four sharp erect spiniform tubercles. From the analogy of *Hestias*, I confidently expect that the male will prove to have its head similarly armed with a tubercle. I have named this curious insect *Ceratomanthis Saussurii*.

I also exhibit the two sexes of an insect captured, the female by Mr. Peal in the Naga hills, and the male by Dr. Cameron in the Bhûtan Doars; in the former the head is provided with a long and slightly tapering foliaceous frontal horn, truncated at the apex, longitudinally obtusely carinate in front and sharply crested behind, and nearly three times as long as the head is high; in the latter this great foliaceous horn is reduced to little more than a tubercle only about half as long as the head is high. I have named this

insect *Phyllocrania Westwoodi* notwithstanding that the prothorax has no foliaceous expansions.

Similar sexual differences may be looked for in *Phyllocrania*, *Parablpharis*, and *Sibylla*, the males of which are still unknown.

In the *Phasmida*, we meet with apparently similar sexual differences, but in these insects the great reduction in size and thickness of body that has taken place in the males may well have effaced the horns and foliaceous lobes which after all are generally relatively not very greatly developed in the females; we see the truth of this in the cases of the genus *Phyllium*, wherein the foliaceous lobes of the abdomen and legs of the female are relatively very large and those of the male are consequently by no means inappreciable, and in the case of *Lonchodes insignis*, in which in males more than ordinarily stout the cephalic horns reappear in rudiment though they have disappeared in slenderer individuals.

Mr. WOOD-MASON also announced that he had ascertained by actual observation of living specimens belonging to several species that the femoral brushes described at a recent meeting are used by the *Mantidæ* to keep their eyes in a functional condition; and that they are present in the young when they quit the egg.

The following papers were read:—

1. *On the physical explanation of the Inequality of the two semi-diurnal Oscillations of Barometric Pressure*.—By H. F. BLANFORD, Esq., F. G. S., *Meteorological Reporter to the Government of India*.

(Abstract.)

Mr. BLANFORD said that the paper he had to bring before the meeting dealt with a phenomenon which to observers in tropical countries is one of the most familiar and most regular in the whole range of Meteorological physics, but is, at the same time, one, on the explanation of which the greatest diversity of opinion prevails.

It needs but to observe the rise and fall of the barometer for a day or two, in about any part of India, to learn the fundamental fact, that the atmospheric pressure undergoes daily, a double oscillation which is so regular in its occurrence, that except during the passage of a cyclone it is scarcely ever masked by the irregular or not periodic variations. From between 8 and 4 in the morning the pressure begins to rise, slowly at first, afterwards more rapidly, and it attains its maximum generally between 9 and 10; the exact hour varying at different seasons of the year. It then falls with great rapidity during 3 or 4 hours after noon, and attains the lowest pressure of the 24 hours about 4 or 5 P. M. Again a

rise takes place till about 10 at night; but this second maximum is somewhat less than that of the morning. Finally it falls, but less than in the afternoon, and reaches a minimum between 3 and 4 A. M. Such is the phenomenon as usually observed in Bengal, but it is subject to some local variations, both as to the time of the extremes and the relative and absolute amplitude of the oscillations. On hill stations 6,000 or 7,000 feet above the sea, the afternoon minimum is generally not quite so low as the morning minimum, and the morning maximum occurs later. And, on the plains, the morning maximum occurs earlier and the afternoon minimum later in the dry hot weather than in the rains; at dry stations in the interior than at damper stations near the coast. It decreases in amplitude as we retreat from the tropics towards the poles, and in Europe it is always more or less masked by the greater irregular oscillations to which the atmospheric pressure is there subject. In the tropical Atlantic the rise and fall of both oscillations are nearly equal, and apparently less than on the land.

The phenomenon is generally spoken of as the barometric tides, but it is clearly not a phenomenon of the same order as the oceanic tides, since it is quite independent of the position of the moon, and has reference not so much to the position of the sun, as to the length of time he is above the horizon. Atmospheric tides there undoubtedly are, similar in general character and origin to those of the sea, but these are not to be detected in the oscillations of the barometer, except as small residual phenomena, when readings are taken at different elevations and afterwards compared and reduced.

The occurrence of the diurnal oscillations and their regularity was observed as long ago as the middle of the last century, and many hypotheses have been put forward to account for them.

One of the earlier explanations was that of Kaemtz who referred them to the action of the sun's heat, in expanding the air and causing an overflow to East and West; while the superincumbent mass of the atmosphere is reduced to a minimum where the sun's heat falls most directly. But this would fail to account for the double tide, and accordingly Sabine and Dove supposed that the whole phenomenon is composed of two distinct elements; viz., a single oscillation, which was explained on Kaemtz's hypothesis; the result of which, taken by itself would be to produce a minimum at the hottest time of day and a maximum at the coldest; and a double oscillation which they referred to the varying tension of water vapour which has (in dry countries at least) two maxima and two minima. This view was adopted by Herschell in his well known treatise, and also by Col. James in his *Handbook of Instructions*. But it was found when tested by observation, that it failed to explain the phenomenon. At Bombay, for instance, it was found that when the curve of vapour tension was subducted from the

curve of the barometric oscillation, instead of leaving a single curve of one oscillation, a very irregular curve resulted, in which the double oscillation was still a very prominent feature. This, it was suggested, was a local peculiarity owing to the alternation of the sea and land breezes; but it was speedily discovered that so far from being exceptional it was the general rule in all parts of India, and that the hypothesis of Dove and Sabine could in no way be made to suffice for the facts.

Another view had been put forward independently by Brunn of Trevandrum and Lamont of Munich, and had received support from Mr. Hornstein of Vienna. This is that the element of the double oscillation is an effect of either the Solar magnetism or electricity, and Mr. Hornstein had demonstrated that, in certain respects, the phenomenon shows a periodicity corresponding to the frequency of sun-spots and auroras, and also of the period of the sun's rotation on his axis. Beyond, however, such coincidences, which seem to establish no more than that the phenomenon varies with certain solar phenomena and others which are known to vary with them, there appears to be little ground to assign the tides to magnetic rather than to thermal agency.

Meanwhile Espy, Davies and Kreil had, as it appears, independently of each other, drawn attention to one necessary consequence of the diurnal heating of the atmosphere, which had escaped the attention of Kucintz, Dove and Sabine; and which, whether affording a complete or only a partial explanation of the oscillation, must cause a double diurnal oscillation such as is to be accounted for. This is the increase of atmospheric pressure produced by the expanding atmosphere in the forenoon, and that again produced by its contraction in the evening. It follows from elementary mechanical laws, that a mass of air resting on the ground and expanding, must exercise pressure in excess of that due to its weight; that this pressure will increase as the rate of expansion increases, will be constant when the rate of expansion is constant, and will fall as that rate decreases. Thus will arise an oscillation of pressure, similar to, and about coincident with the morning oscillation. As a partial verification of this coincidence, Mr. Blanford stated that he had found, on comparing the Calcutta diurnal curve of pressure with that of temperature, that the instant of the morning maximum of the former falls less than half an hour later than the instant of most rapid rise of the latter near the ground surface.

In the evening, the contraction of the atmosphere in consequence of its cooling, will necessarily produce an increase of pressure, arising from the subsidence of the contracting atmosphere, and this seems a not improbable explanation of the evening maximum. It appeared to be somewhat inexplicable that this suggested explanation has not received more attention at the hands of physicists. As put forward by Davies and Kreil it presents some weak points, but these are not essential.

On this hypothesis, since the two diurnal oscillations are due to different kinds of action, there would be nothing even apparently anomalous in the fact of their inequality. But, as a fact, the inequality of the two oscillations is greater on the land than on the sea, greater in dry than damp weather, and undergoes reversal between the plains and mountains. As a distinct feature of the whole phenomenon it deserves independent study.

Pointing out that the whole oscillation may be considered as compounded of a single and double oscillation, the former of which produces the inequality referred to, Mr. Blanford said that in discussing the diurnal variation of the winds at Calcutta he had found that there was a diurnal single oscillation of the wind-direction coinciding in the hours of change &c., with the barometric single oscillation in question, and also a double oscillation of the wind bearing the same relation to the double barometric oscillation. Of these the first is the most important. The tendency of the wind is to blow from the West (the direction of the ordinary land-wind) during the day, and the opposite during the night. It is difficult to escape the obvious inference that the coincidence of a westerly wind with falling pressure, and an easterly with rising pressure, both in the case of the single and double oscillation is not fortuitous.

If the diverse effects of the sun's heat when falling on land and water be investigated, it will be found that a greater pressure will be generated over the former than over the latter. A given quantity of heat used up in the one case in heating dry air, in the other in charging it with vapour without heating it, will raise the pressure of the dry air $7\frac{1}{2}$ times as much as that of the moist air. After allowing much for heat reflected, radiated &c., it still seems highly probable that a portion of this difference will remain outstanding, and thus will arise a diurnal inequality of pressure over land and sea, a pressure, however, due to the internal motion of the air and not to the quantity which exerts weight. The tendency of this will be to produce a transfer of air from the land to the sea in the day, and a compensating return current at night.

That the amplitude of the day oscillations does depend to a great extent on the kind of work done by the sun's heat is evidenced by the small amplitude of the barometric curves in the rains as compared with those of the dry weather, at sea as compared with land, and on cloudy days as compared with clear days, which last fact was established by Kreil and Lamont.

Within the last few months a very elaborate summary of the data recorded in different parts of the world, bearing on the subject of the barometric tides has been published by Mr. Alexander Buchan. In reviewing these data Mr. Buchan has drawn a conclusion as to the variation of the diurnal fall of pressure which at the first glance appears very paradoxical, but which falls in so admirably with the conclusions just described, that it

has been the immediate occasion of the present paper. Mr. Buchan has pointed out that the fall of pressure during the afternoon hours seems to depend much on the local distribution of land and water as well as on the position of the sun, the humidity of the air, and the direction of the wind, particularly considered as a land or sea wind; and that while numerous illustrations could be adduced shewing a larger oscillation over the same region with a high temperature and a dry atmosphere, than with a low temperature and a moist atmosphere there are some remarkable and striking exceptions. One of them is presented by the Mediterranean on the coasts of which sea, the amplitude of the oscillation is least, precisely at that season when the air is driest. Mr. Blanford remarked that this apparent anomaly is readily explained by the action already described. The inequality of the diurnal pressures generated over land and sea will be greatest when the sun's action is most direct; when the solar rays, unimpeded by cloud, fall on the land in the one case, on the water surface in the other, and under such circumstances the transfer of air from land to sea during the day will be a maximum, and the diurnal fall of pressure on the coast will be diminished by the local accumulation of air.

It appears then in a high degree probable that a great part of the diurnal irregularity of the barometric tides is due to the transfer of air from land to sea and *vice versa*, and to a similar transfer which may be proved to take place between the plains and the mountains. But the phenomenon is very complex, and much study and labour are yet required to unravel its elements, consisting as they do, partly of elastic and reactionary pressure, partly of dynamic pressure, and partly of variations in the static pressure of the atmosphere. Till this shall have been done, and it shall be found, after all, that heat and its effects are insufficient to explain the phenomenon, it seems premature to resort to magnetic and electrical phenomena for the explanation of the barometric tides.

2. The *Cyclostomacæ of the Dapla Hills, Assam*.—By Major H. H. GODWIN-AUSTEN, F. R. G. S., F. Z. S.

The present list is confined to the operculated land shells and includes 33 species, of which eleven are described and figured as new; five were previously known from Darjiling; thirteen are well-known Khási and Nága Hill forms, and three or four extend to the Shán States. The *Helicidæ* will form the subject of a second paper, in which the author hopes to be joined by Mr. G. Nevill. The most interesting species described appears to be *Megalomastoma tanycheilus*.

The paper, which is illustrated by one plate, will be published in the Journal Part II, No. 8, 1876.

3. *Description of Pelomys Watsoni, a new species of Mouse from Sind.*—By W. T. BLANFORD, F. R. S., &c.

Amongst some small mammals and reptiles in spirit received from Mr. H. E. Watson of the Sind Commission, are two specimens of a mouse from the southern extremity of the Khirthar range about 50 miles north-west of Kotri. At first from the very peculiar characters of the molar teeth, I was inclined to consider this animal a new genus, but, although the molars of adult *Pelomys* have not been described, those figured in Peters's 'Reise nach Mozambique' being apparently scarcely worn, it appears highly probable that in an older animal they would exhibit the peculiarities of the Sind rodent. In both species the upper incisors are grooved, and the hallux of the fore-foot has a small teguliform nail. I propose to name the new species after Mr. Watson, to whom we are indebted for several additions to the Sind fauna, both Dr. Day and Mr. Hume having been much aided by him when collecting in Sind.

Pelomys Watsoni, sp. nov.

The fur is harsh and consists of very flat hairs each with a broad groove down one side: the general colour is brown, approaching that of a hare, above, dirty white below. The hairs are dusky grey at the base, then darker, tawny towards the ends on the back and sides, numerous longer hairs, either entirely black or with a black tip, being scattered throughout the back. Average length of hair on the middle of the back half an inch.

Ears rounded, naked outside. Feet pale brown above, soles naked, toes 5—5, all with claws, the hallux of the fore foot rudimentary but furnished with a small flattened nail. Tail stout, rather shorter than the head and body, finely ringed, and thinly clad with short bristly hairs which are black above, tawny on the sides and below.

The skull is typically murine; the anterior palatine foramina (*foramina incisiva*) very long, extending fully two-thirds the distance from the incisors to the molars. The incisors in both jaws are deep orange in front, the upper pair grooved, the lower smooth. The molars are three in number, on each side of each jaw, with deep folds of enamel arranged in semicircular lobes having their convex edges in front; these lobes in the upper teeth are arranged in 3 longitudinal rows, in the lower teeth in two. The anterior upper molar contains 7 lobes, the second 6, the hindmost 4, the anterior lower molar has 7 lobes, the second 5, the third 4, the posterior lobe in each of the lower molars being small and central.

The following are the dimensions taken from a specimen in spirit.

Total length of animal (an adult female)

from nose to end of tail,.....	8·65 in.	·219 met.
Length from nose to anus,	4·55 "	·116 "
Do. of tail,	4·1 "	·105 "
Do. of ear,	0·57 "	·014 "
Do. of skull,	1·22 "	·0305 "
Breadth of do.,	0·62 "	·015 "

A fuller description with figures of the skull, &c., will be given in the Journal of the Society.

The occurrence of this African form in Sind is quite in accordance with other peculiarities of the fauna. The only other known species of the genus is *P. fallax*, Peters, from Mozambique.

4. *Amphistoma hominis*: n. sp. *A New Parasite affecting Man.*—By
T. R. LEWIS, M. B., and J. F. P. MCCONNELL, M. B.

The parasite forming the subject of this paper has not, so far as we have been able to ascertain, been previously described; nor indeed have any species of the genus to which it belongs been, heretofore, found to affect man.

The anatomical and other details here recorded are based on two distinct series of dissections and observations: the earlier series of observations were conducted in June 1871 in connection with specimens of the entozoon obtained from Dr. Joseph O'Brien of Gowhatty; and the second series during the present year, on specimens which had remained undescribed for several years in the Pathological Museum of the Calcutta Medical College.

Regarding the former specimens Dr. O'Brien in writing to one of the authors of this paper (T. R. Lewis,) says:—"I send to-day—28th May, 1871—a small bottle containing some curious looking parasites found by Curran [Dr. R. H. Curran, since deceased] and I, in the intestines of an Assamese man who died of cholera..... We found them certainly, by hundreds; they lay chiefly in the vicinity of the Ilco-colic valve, and numbers were turned out of the vermiform appendix. I have sent the vermiform appendix; in it you will find two or three of the 'boasts' *in situ*. When the intestine was freshly opened they exactly resembled miniature snails and they appeared to stick on to the mucous membrane

of the gut by means of the pale sucker-like surface on the inferior portion of the body." On adding a solution of chloride of zinc to the specimens, "it had" the writer continues, "the effect of bleaching their coats and destroying the moist glistening appearance in which they formerly rejoiced." The coats of specimens thus treated, it may be remarked, became eventually grayish black.

The specimens which had been preserved in the Medical College Museum, and which formed the basis of the other series of observations (by J. F. P. McConnell), were, strange to say, obtained from the intestines of a man who was also stated to have died of cholera. This of course, might have been a coincidence merely, or it might be that owing to the irritation set up on the mucous surface of the intestinal canal by the parasite cholera-like symptoms may have become developed in addition, possibly, to some other fatal form of disease in both cases. With regard to the first case it may be mentioned that cholera was very prevalent at the time at Chowhatty, but that no such parasites were found in other cases.

The history of the specimens forming the second series of observations, and which were lodged in the Museum, is thus briefly recorded in the Catalogue of the Medical College Museum :—

"The cæcum of a native prisoner who died from cholera in the Tirhoot gaol hospital, with a number of peculiar and, probably, hitherto unrecognized parasites, found alive in that part of the intestinal canal." "*(Presented by Dr. Simpson through Professor E. Goodree).*"

With reference to this preparation, the following very interesting particulars from the Annual Jail Report of Tirhoot for 1857 have been very kindly placed at our disposal by the Surgeon-General, Indian Medical Department. The prisoner, Singhesur Doradh, aged 30, was attacked with cholera on the 18th and died on the 14th July 1857. "Had not been in hospital previously, and was employed in cleaning the jail."

The *post-mortem* examination was made three hours after death :—
 "Colon externally livid, contracted ; contains a little serous fluid with flakes of mucus. Mucous membrane healthy except venous injection. In the cæcum and ascending colon numerous parasites like tadpoles, alive, adhering to the mucous membrane by their mouths. The mucous membrane marked with numerous red spots like leech-bites from these parasites. The parasites found only in the cæcum and ascending colon, none in the small intestines." This description is by Dr. Simpson, who adds, "I have never seen such parasites, and apparently they are unknown to the natives. They are of a red colour, size of a tadpole, some young, others apparently full grown, alive, adhering to mucous membrane,—head round, with circular open mouth which they had the power of dilating and contracting. Body short and tapering to a blunt point."

The lithograph (Plate III) which accompanies this preparation gives a very correct representation of the cæcum with portion of the adjacent ileum from the above case. It has been drawn to the exact size of the specimen as it now exists in the Medical College Museum. Several of the parasites have also been delineated. The majority were found free, *i. e.* detached from the surface of the bowel, but others are seen to be still slightly adherent or entangled in the folds of the mucous membrane. The solitary glands are seen to be throughout prominent and hypertrophied, a condition which although very common in cholera, appears in this instance to have existed (and still persists) in a very remarkable degree,—probably on account of the great follicular irritation which these parasites by their presence, are likely to have excited.

Amphistoma hominis, sp. nov.

The parasite belongs to the *Trematode* or Fluke order of Helminths and to the genus *Amphistoma*. We have endeavoured to refer it to one or other of the tolerably numerous species belonging to this genus but have not been able to find that it belongs to any hitherto described species, so have decided on naming it *Amphistoma hominis*.

The specimens in our possession vary slightly in size, possibly owing to the different mode of preservation—those which were obtained from the Assamese having first been treated with chloride of zinc and subsequently preserved in glycerine, whereas the other samples appear to have been preserved in spirit throughout. Those of the former kind are of a grayish dark colour owing, as already stated, to the action of the zinc solution, whereas those of the latter are of a grayish yellow tint. Their greatest length varies from the $\frac{1}{4}$ to $\frac{1}{2}$ of an inch (5 to 8 millimeters) and the greatest width, across the caudal sucker, from $\frac{1}{8}$ " to $\frac{3}{8}$ " (3 to 4 millimeters). Its form is somewhat difficult to describe: Fig. 2 *a* in the Plate represents a ventral view of it; fig. 2 *b* a dorsal, and figs. *c* and *d* lateral and semidorsal views—all sketched double their natural size. It may be roughly divided into an anterior and a posterior half, the length of the former being about half the transverse measurement of the latter. At the anterior extremity (slightly on its ventral aspect) the oral sucker is readily detected, and about $\frac{1}{10}$ of an inch below this sucker is the genital pore. The posterior half of the *Amphistoma* is composed of a somewhat flattened, circular bursa, within which is placed the caudal sucker proper. The bursa may be observed in different states of contraction in different specimens; when flattened out, (as in figs. *a* and *b*, Fig. 2, Plate III) it measures about $\frac{1}{4}$ of an inch transversely. In some specimens this pouch is seen to have become folded laterally, leaving merely a slit in the long direction of the parasite and almost hiding the sucker itself from view.

The *Caudal sucker* is a firm cup-shaped organ composed of circular and



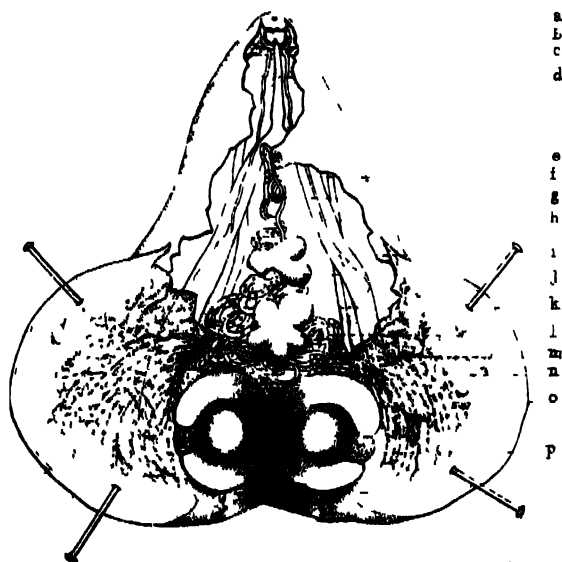
Fig 1 A portion of intestine is open with a cluster of AMPHISTOMA HOMINIS adherent—natural size

Fig 2 a-d AMPHISTOMA HOMINIS in various positions x 7

Fig 3 Ova of AMPHISTOMA HOMINIS x 65

radiating muscular fibres. Its orifice is about $\frac{1}{10}$ th of an inch in transverse diameter, but $\frac{1}{15}$ " when the measurement is taken from the outer margin of the rim forming the sucker. In the adjoining figure a vertical section of this sucker may be observed.

In this drawing the anatomy of the entozoon may also be studied as viewed from the ventral surface. The parasite is represented as magnified 12 diameters. Commencing with the oral sucker (*a*) we find it to consist of a transversely placed oval orifice, surrounded by a ring of muscular tissue and presenting in many specimens a slight, papilla-like prominence. The orifice leads to a bulbous heart-shaped pharynx—with the apex directed anteriorly (*b*). At the lower margin the *Nervous ganglia* (*c*) may be recognised—the ganglia of one side communicating with those of the other by means of a comparatively strong cord passing transversely behind the œsophagus. Nervous filaments are given off which spread in all directions, of which the largest are the cords (*h*) which may be traced along the ventral surface of the two intestinal canals.



AMPHISTOMA HOMINIS.—Longitudinal Section. x12

The *Œsophagus* (*d*) is $\frac{1}{15}$ " or $\frac{1}{10}$ " in length, bifurcates behind the genital pore—generally a little above the level of this aperture, but sometimes

below. As indicated in the figure (i), the two canals thus formed terminate caecally about opposite the middle-half of the caudal sucker.

Closely attached to the canal on either side, and easiest seen when the dissection is conducted from the dorsal surface of the *Amphistoma*, are the main branches of the water-vascular system (k), with which numerous fine *Canaliculae* may, in suitable specimens, be seen connected along the entire course of the main trunks.

The *Genital pore* (c), as before stated, is situated about $\frac{1}{3}$ " below the oral sucker. The orifice is surrounded by muscular fibres arranged in a circular and radiating direction. Into it open the two channels of the sexual apparatus of this hermaphrodite entozoön. The *vagina* (f) is, in mature specimens, filled with ova, and it measures near its exit-termination about $\frac{1}{16}$ " transversely. The convolution of the vagina and uterus occupy a great portion of the interior of the worm, to such an extent indeed is this the case that it is difficult to prick the skin of the dorsal surface without witnessing the escape of ova by the rupture of some of the uterine convolutions. In front of these convolutions, as seen from the ventral aspect, is the ovarian portion of the reproductive apparatus (l) and closely adjoining are the lobulated *testes* (j) from which the *vas deferrens* with its continuation the *ductus ejaculatorius* (g) may be traced. A double twist may generally be perceived to have formed along the course of this duct; its width between this spot and the genital pore is about $\frac{1}{16}$ " or about half that of the vagina at the same part.

The *ova* Fig. 3, Plate III, have firm capsules, and are provided with the operculum common to the ova of flukes. The average measurements proved to be $\frac{1}{16}$ " in length by $\frac{1}{32}$ " in diameter.

The ramifications of the *vitellogene ducts* with the glandules may be perceived through the cutaneous covering of the parasite, presenting a dendriform arrangement (u), especially distinct all over the surface of the *bursa*; and their main ducts (m) may be seen in some specimens directed towards the ovarian body. In addition to these glands the cutaneous envelope of the entire entozoön is seen to be plentifully supplied with glandules, of varying size, but averaging about $\frac{1}{32}$ "; interspersed amongst which are numerous minute cells averaging $\frac{1}{64}$ " to $\frac{1}{80}$ " in diameter, generally of hyaline appearance and not unlike the calcareous particles common to entozoa. They withstand the action of dilute hydrochloric acid.

With these remarks we conclude our description of the leading features in the anatomy of this new parasite and we trust it is sufficiently explicit to enable future observers to experience but little difficulty in identifying it.

5. *Popular Songs of Hamirpur District in Bundelkhand.* (Second Paper).—By VINCENT A. SMITH, B. A., C. S.

(Abstract.)

This paper is in continuation of the paper on Hardaul songs published in the Journal, Part I, No. IV, for 1875, and comprises the text and translation, with a commentary, of twelve songs.

These are all Caste Songs, that is to say, songs which describe or specially refer to the occupations and characteristics of the caste of the singer. The castes, specimens of whose songs are given, are (1) Sunár, (2) Luhár, (3) Barháí, (4) Kahár, (5) Náí, (6) Kol, (7) Naṭ, (8) Khangár, (9) Dumár, (10) Lodhí and (11) Telí, (two songs). The songs are various in character, some being little more than catalogues of goods made by or wares sold by the singer's caste-fellows, while others are satirical.

The dialect of eleven of the songs is that of Maudhá, the eastern parganah of the Hamirpur district; one song, No. X, is a specimen of the Hindi spoken by the Lodhís of Parganah Panwári in the south-west of the district.

It is believed that the verbal forms of these compositions are deserving of attention, and that the songs will be of interest as pictures of native society.

6. *Note on the use of the Radiometer as a Photometer.*—By

A. PEDLER, Esq., F. C. S., Lond. and Berlin.

The discovery by Mr. Crookes of the so-called mechanical action of light has naturally attracted considerable attention, and has led to numerous experiments in this direction. The instruments which are employed to shew this action of light may be conveniently divided into two classes. In the first class, a light beam, generally of straw with pith ends, is suspended in a vacuum tube by an exceedingly fine glass thread, and the effect of the heat and the light rays falling on either end is measured by the torsion of the thread. In the second class of instruments, which are called "Radiometers or Light Mills," a vane with four arms of some light material is suspended on a fine steel point, such as a needle, resting in a cup of glass, so that the arms are able to revolve horizontally upon the centre point, in the same manner as the arms of an ordinary anemometer revolve. To the extremity of each arm is fastened a thin disc of light material, such as mica, which is silvered on the one side and blackened on the other, all the black surfaces facing the same way. The whole is enclosed in a thin glass globe which is exhausted to the utmost limit which can be produced by a Sprengel mercurial pump. On exposing the instrument to light the vane revolves with a velocity proportional to the strength of the light. The former class of instruments is not so well suited for travelling as the latter,

and the experiments which are here described were performed with one of the second class of radiometers, which had been forwarded to me from England. In a paper "on the Mechanical Action of Light" by Mr. Crookes,* a few photometrical experiments with this instrument are given, and from them it is concluded that the radiometer is a perfect photometer. The author says "By this means Photometry becomes much simplified, flames the most diverse may readily be compared between themselves or with other sources of light; a standard candle can now be defined as one which at x inches off causes the radiometer to perform y revolutions per minute, the values of x and y having previously been determined by comparison with some ascertained standard; and the statement that a gas flame is equal to so many candles may with more accuracy be replaced by saying that it produces so many revolutions." This conclusion being of great practical importance, and as the experiments on which it was based were very few in number, it appeared to be advisable that they should be, if possible, confirmed by a more extended series of observations. For this purpose during the past six weeks, I have made a continuous series of measurements with this instrument, which do not however enable me to speak with great confidence in the radiometer as a photometer.

The mechanical effect produced in a radiometer is admittedly the product of the two forces, light and heat, and as it is well known that the illuminating power of a gas jet or candle flame depends very essentially upon its temperature, I thought at first that it would be better when testing the radiometer photometrically to employ the total radiation from the flames.

My first experiments consisted in observing the radiometer, which was placed at a fixed distance from a gas flame, at the same time that I was testing the gas flame by the old photometrical method of Bunsen. For this purpose the radiometer was placed inside the photometer, in which it has been kept during the whole of the experiments; this photometer is entirely lined with black velvet, so that we have only to deal with the radiation from the light itself, and the phenomena are not complicated by any radiation from extraneous sources, as would be the case if the experiments were performed in an open room. The distance of the radiometer from the gas jet in these preliminary experiments was 27.2 inches; the gas-jet a standard argand one, burning 5 feet of gas per hour, and the observations of the radiometer are here given in quarter revolutions, that is to say, the number of arms of the vane which pass a given spot in a given time.

* Quarterly Journal of Science, July, 1875.

Illuminating power of Gas-jet, in standard sperm candles burn- ing 120 grains per hour.		Number of quarter-revolutions of Radiometer per minute (at 27.2 inches distance).
1.	12.84	85.7
2.	12.04	40.0
3.	10.10	29.0
4.	11.48	38.0
5.	12.42	35.0

It will be seen that there is here a general sort of agreement between the number of revolutions and the illuminating power, but that in one or two instances discrepancies occur. I therefore thought it better to extend the observations of the radiometer by altering the distances from the source of light. By doing this, it would also prove whether the mechanical effect produced could be brought under any definite law. I therefore arranged that the radiometer could be placed at the distances 10, 15, 20, 25 and 30 inches respectively from the gas-jet, and made a series of observations of the rapidity of revolution, two and, in many cases, three measurements at each distance being taken. The results are given in the table below, and it will be again seen, that there are discrepancies between the illuminating power and the observed revolutions, and that also these discrepancies extend throughout the observations at the varying distances.

	Illuminating power of gas-jet.	Distance of radiometer from gas jet.				
		10 inches	15 inches	20 inches	25 inches	30 inches
	12.42	135	79.3	44.25	26.67	19.67
	10.58	162	108.6	66	45.6	27
	13.12	162	121.6	75	43.6	29
	9.53	162	97	60	38	25
	13.42	154.67	104.6	64.5	46.6	29
	13.06	170.6	109.6	68	43.6	31.5
	11.86	163	112	67	46	34
Average,	12.00	167.02	104.57	63.25	41.25	29.45
Practical result, calculated to the rate of 10 per minute at 30 inches distance		69.36	39.63	23.91	16.69	10.0
Theoretical result, calculated according to law of inverse squares,		90	40.0	22.5	14.4	10.0

At the bottom of the table I have calculated the observed rate of revolution, starting with a supposed unit of 10 quarter-revolutions, at the distance of 30 inches; and it will be seen that these results agree very closely with those calculated according to the law of inverse squares; that is to say, the number of revolutions of the radiometer will be inversely

proportional to the square of the distance from the source of light. But it will also be noticed that there is one marked exception to the rule, and this is at a distance of 10 inches from the gas flame where the rapidity of revolution is great. Here the actual number of quarter-revolutions amounted to 59·86 per minute, whilst theoretically they should have been 90. Evidently when the radiometer is rotating rapidly, there must be an immense increase in the friction so as to reduce the rotation by one-third of the whole amount. There are also indications in the above table that when the radiometer is rotating very slowly, there is a considerable disturbance from the theoretical rate of revolution, probably showing that friction has much influence both when the rotation is slow and rapid.

As the result of these observations was not very satisfactory in so far as the applicability of the radiometer to photometry is concerned, I abandoned my former idea, that both the light and heat rays should be allowed to act upon the radiometer; and a second series of observations was commenced, in which the dark heat rays from the gas-jet were filtered off by passing the light through a glass cell one inch in thickness with parallel sides, which was filled with a saturated solution of alum. The method of observation was similar to that before described, and under these circumstances it was found that the rapidity of the revolution of the vane fell very considerably; this will be seen from a comparison of the following table with the preceding one.

Dark Heat rays cut off by Alum. solution.

	Illuminating power of gas-jet.	Radiometer in quarter-revolutions per minute.				
		10 in.	15 in.	20 in.	25 in.	30 in.
	14·30	42·5	24	14·5	8·5	5·0
	13·30	40	22·5	12·5	8·0	4·5
	15 52	48	26	16	11·5	6
	13 10	39·5	23·5	14·5	9·5	6
	13·76	44 5	31	17	9·5	5·75
	12·79	42	24·5	14	8·5	5·0
Average,	13·8	42·75	25·25	14·42	8·92	5·37
Calculated to 10 per min. at 30 inches distance, ..	}	79·6	47·0	26·8	16·6	10
Theoretical,						
	..	90	40	22·5	14·4	10
	11·5	25	13·5	8·5	5	
	9·1	20·5	11·0	6		
	9·56	18·5	13·0	7·5		

The velocity of rotation has, it will be seen, fallen to about one-fourth of what it was previously, and this is due almost entirely to the absorption

of the dark heat rays by the cell of alum solution; there is, of course, a certain loss of light by the use of the cell of liquid, and, in order to ascertain the amount of this, some experiments were made with the Bunsen photometer, which gave as an average of several determinations, that a total loss of 8·6 per cent. of light occurred in the passage through the alum cell. This shews then that from two-thirds to three-fourths of the mechanical effect in the radiometer, is, in the case of a coal-gas jet, due to dark heat rays, and not to light rays at all.

In this series of observations we again see a general agreement of the average of the results at the varying distances, with the law of inverse squares; but when the experiments are examined in detail, it will be found that there are somewhat serious divergences from the theory, and that the discrepancies are still greater when the rapidity of the rotation is compared with the illuminating power of the gas-jet on the separate occasions. The differences between the illuminating powers and the velocity of revolution are more marked in this table than in the last, and I cannot help thinking that the value of the radiometer as a photometer has been much overestimated.

Apparently from these experiments, which, however, are fewer in number than I should have wished, we must either believe that the old process of photometry cannot be thoroughly depended upon, or that the radiometer does not yield absolutely constant results. During the experiments I have made, there have been some instances in which I obtained some very curious alterations in the rapidity of rotation of the radiometer with scarcely any apparent alteration in the external circumstances, these, however, I cannot at present satisfactorily explain. Since making the above experiments I have received a paper by Mr. Crookes (published in the Proceedings of the Royal Society, vol. XXIV, p. 276) in which he proves, that different parts of the spectrum have very different actions on the rotation of the radiometer; and as the light of coal gas varies from white to yellow, it is possible that the origin of the discrepancies between the radiometer and photometer may be due to the differences in colour of the light. There are, however, other photometrical instruments such as, "the Sugg Jet Photometer," and it is my intention to compare this instrument with the radiometer. During these experiments, I have of course not neglected to test the radiometer with the standard sperm candles, and even here I obtained somewhat discordant results. As an average of my determinations, I found that my radiometer, when placed at a distance of 10 inches from a candle burning 120 grains of sperm per hour, made 18·2 quarter rotations per minute. The average of the radiometer under the same circumstances with a gas flame of 12-candle power was 157·02 quarter-revolution; according to the radiometer, therefore, *under these conditions*, the

illuminating power of that gas flame would be only 8·6 candles, or about two-thirds of the illuminating power as measured by the old process.

It is, I think, evident from these experiments that it would be impossible to say that because a Radiometer rotated sixteen times as rapidly with one flame as it did with another, that the former flame possessed sixteen times the illuminating power of the latter; for it must be seen that in working with either a very high or very low rate of revolution, there appears to be considerable disturbance due to the friction of the instrument. It is I believe possible, and even probable, that much better results will be obtained, by working the radiometer always to a fixed number of revolutions (say about 30 or 40 quarter-revolutions per minute); and by altering the distance of the flame until such rapidity is obtained; in this way the friction of the instrument would be reduced to a constant quantity, and the comparative luminosities could be judged by the squares of the distances. These observations to be conclusive will take a considerable time to carry through, but I hope at some future period to lay them before the Society.

Through the courtesy of the Rev. Father Lafont I have been able to test a second radiometer of a similar construction, having blackened discs of an equal size, which are suspended in the same way on a glass pivot.

I have found that it is a much more sensitive instrument than my own, but that the relative sensitiveness varies according to the velocity of rotation. Some of the comparisons are instructive, and are given in the table below; No. 1, Radiometer being the one used in the former experiments, and No. 2, the instrument belonging to Father Lafont.

SOURCE OF LIGHT.	Radiometer, No. 1, Quarter- revolutions per min.	Radiometer, No. 2, Quarter- revolutions per min.
Standard Sperm Candle, burning 126 grains per hour, ..	19	34
Gas Jet 13·76 candle power at 10 inches distance,	160	221
" " " " 20 " "	74	119
" " " " 30 " "	35·5	62
" " " " 10 " with alum cell inter- posed,	44·5	78
" " " " 20 " "	17	35
" 9·56 " " 10 " "	18·5	32·5
" " " " 20 " "	7	9

It will be seen that these comparative experiments confirm what has been said before that radiometers at high and at low velocity of rotation give somewhat uncertain indications; for instance at a high rate of revolution No. 1 radiometer is about one-third less sensitive than No. 2; at a

medium speed it is about one-half as sensitive, whilst at a very low speed of rotation the two become almost equally sensitive. So far as can be judged, the only difference between the two instruments must be in the amount of exhaustion; but whether a more perfect vacuum will produce a more sensitive instrument or the contrary, I cannot pretend to say. The results here described, are of course, only applicable to the "Light Mill;" but I should imagine that the other kind of radiometer, where the effect is measured by torsion, would probably give more constant results. I do not even now despair of the Radiometer being of some use in Photometry, although I very much doubt if it will ever supersede the old Bunsen method with the standard candles.

7. *A Sketch of the Vegetation of the Nicobar Islands.*

By S. KURZ, Esq.

(Abstract.)

The Nicobar Islands are geologically divisible into two groups, the the Southern, which belongs to the brown-coal formation, and the Northern, where alluvial deposits are pierced by plutonic rocks. This geological division coincides with the botanical one, at least in its broad features; the islands of the northern group being characterized by extensive grass-heaths, while those of the southern group are forest-clad to the very summit. The vegetation divides into the following five groups:—

1. The mangrove-forests, which grow on the swampy alluvium at the debouchure of the rivers.

2. The beach forests, which occupy the calcareous sand of the beaches and are the chief zone in which not only the cocoa-nut palm grows but on which the Nicobarese build their huts.

3. The tropical forests, growing on different strata. Of these, two varieties are for the present separated:

a. The coral-reef-forests, which grow on the upraised coral-lands;

And

b. The true tropical forests, growing on plutonic rocks and polycistina-clay. Those growing on polycistina clay are alone fully treated, while those on plutonic rocks and on calcareous strata had to be omitted for several reasons.

4. The grass-heaths. These occupy the hilly plateau of the islands of the Northern group and offer many peculiarities.

5. The marine vegetation, which is restricted to a few phanerogamic plants, while seaweeds and other algæ are abundantly represented.

Cultivation is little represented on these islands and, therefore, not separately treated, but the botanical constituents of the forests are given

in full, a list of the plants of these islands being appended, which contains more than 600 species of phanerogams and ferns.

Finally, the author expresses his thanks to Prof. Dr. Pelzeln, Director of the Vienna Museum, for forwarding to Calcutta for his examination the botanical collections made during the visit of the Austrian frigate 'Novara' to these islands.

The paper will be published in full in the Journal, Part II, No. 8, 1876, with illustrations.

Mr. W. T. BLANTFORD said that the circumstance of the Nicobar collections of plants made during the Novara Expedition having been entrusted to Mr. Kurz for determination and description showed the appreciation felt in Germany for Mr. Kurz's botanical labours, and that the Society were indebted to Mr. Kurz for his having presented to them the first results of his study of the collections in question.

Report of the second Sub-Committee appointed by the Council to consider the question of the introduction of a Compounding Fee for Members of the Asiatic Society of Bengal.

The Sub-Committee having carefully considered the earlier papers on the subject, as well as the Report of the Sub-Committee appointed in 1875, with the remarks of the Council thereon; is of opinion

I. With reference to the *Amount* of the Compounding Fee—

That it should be calculated on the basis of the subscriptions paid by *Non-resident* Members, and should be such a sum as will, with the interest accruing from it annually at 4 %, be sufficient to meet the expense incurred by the Society during the average lifetime of a member compounding on entering the Society between 25 and 30, the expectation of life being about 29 years.

The Sub-Committee believe that the sum of Rs. 300 is the lowest that will fulfil these conditions, and they would therefore recommend that this sum be fixed as the compounding fee for a non-resident member.

II. With reference to the Compounding Fee for Resident Members—

The opinion of members of Council and others who have considered the question before has been generally in favour of one single compounding fee for resident and non-resident members, but the only reason given has been the inconvenience and complication that would arise by having two compounding fees, one for resident and another for non-resident members.

As the Society is at present constituted the Sub-Committee consider that some difference must be made between the rates of compounding for resident and non-resident members, and that the best way of avoiding the difficulty of two fees will be to provide that Resident Members who may

have already compounded or wish to compound, shall, in addition to the compounding fee they would pay as non-resident members, pay the difference between the non-resident and resident subscriptions; and it may be remarked that the first rules for compounding passed by the Council in 1872 were based on this principle.

One of the chief inducements for a member to compound is that he may be free from the necessity of remitting his periodical subscriptions when away from the head-quarters of the Society. The proposed rule would meet this completely for all non-resident members, whether in this country or in Europe, while the trouble to Resident Members of paying the extra subscription when in Calcutta would be very slight indeed.

The Sub-Committee would further observe that by calculating the compounding fee on the non-resident rate, it can be fixed at a much lower sum than if it covered resident as well as non-resident subscriptions; and they believe that the rules they now propose will thus be much fairer for all classes of members and also make the compounding fee independent of any future reduction in the resident rate of subscription.

The Sub-Committee have the less hesitation in making this proposal in opposition to the general opinion previously expressed, because they believe that a similar principle obtains in other scientific societies where the members are classed as resident and non-resident, as well as in some clubs.

III. With reference to the Reduction of the Compounding Fee by Length of Membership—

The Sub-Committee are of opinion that some such provision would be desirable, and indeed only equitable to those members who having already subscribed to the Society for many years, might be desirous of compounding for future subscriptions. And it appears also desirable that members who join the Society at an early age, and therefore are likely to find the full amount of the compounding fee more than they can afford to pay, may have an opportunity of compounding at a reduced rate when they can better afford to do so.

The Sub-Committee believe that this object can most conveniently be gained by making a reduction in the compounding fee in proportion to the number of annual subscriptions already paid; and they would therefore recommend that the compounding fee to be paid by members already belonging to the Society should be a reduction, from the full compounding fee, of Rs. 10 for each full annual subscription of 24 Rs. already paid, exclusive of the extra contribution paid by Resident members.

IV. With regard to the alteration of Rule 14 A., so far as it relates to the commutation of subscriptions by members leaving India—

The Sub-Committee believe that the rules they now propose for reducing the compounding fee in proportion to the length of membership in the

Society will amply meet the requirements of members leaving the country for good, and they would therefore propose that the provisions of Rule 14, A. laying down a composition of Rs. 100 be rescinded.

V. With reference to the Investment of the Capital acquired by Compounding Fees—

The Sub-Committee quite agree with the general opinion expressed upon this point by the Council and the former Sub-Committee and would recommend that the capital realised from Compounding Fees shall in each instance be regularly invested by the Treasurer as soon as possible after receipt, and shall not be available towards the current expenses of the Society; but that the interest may be applied to the general purposes of the Society.

On these grounds the Sub-Committee would recommend the introduction of the following rules : *

I. Any member of the Society may, after he has paid his entrance fee, compound for the payment of all future subscriptions as a *Non-resident Member* by the payment in a single sum of Rs. 300.

II. Any member already belonging to the Society may at any time compound for his future subscriptions as a non-resident member by the payment of the above compounding fee, less Rs. 10 for each full annual subscription of Rs. 24 he may have already paid, exclusive of the extra contribution of a resident member.

III. Resident members wishing to compound shall, in addition to the compounding fees calculated as above, be liable *in all cases* to pay a quarterly subscription equal to the difference between the Resident and Non-Resident rates of subscription, during such time as they shall remain resident. Such additional subscription to be chargeable under the provisions of Rule 9 E.

IV. The amounts realised by Compounding Fees shall in all cases be regularly invested by the Treasurer as soon as possible after receipt thereof; and only the interest accruing therefrom shall be considered available for the general expenditure of the Society.

V. In Rule 14 A. instead of the words "commutable into a single payment of Rs. 100" the following should be substituted "commutable into a single payment under the provisions of rule II (of these rules)."

Sd. R. TAYLOR.

J. O'KINEALY.

J. WATERHOUSE.

* These rules though adopted in principle have been modified by the Rule Committee, as will be seen at p. 166. Ed.

LIBRARY.

The following additions have been made to the Library since the Meeting held in July last.

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,

presented by the respective Societies or Editors.

Berlin. Königl. Preussische Akademie der Wissenschaften.—Monatsberichte. April, 1876.

Papadopoulos.—Beiträge zur inschriftlichen Topographie von Klein-Asien.

Bombay. The Indian Antiquary. Vol. V, Pt. 56, July, 1876.

Dr. F. Kielhorn.—Remarks on the Śikshā. *Prof. M. Williams*.—Śraddha Ceremonies at Gayā. *Dr. G. Bühler*.—Grants from Vulaḥhi. *F. S. Grover*.

—Translation of an Episode in the 1st. Book of the Rāmāyana of Tulsī Dās. *Rev. F. T. Cole*.—The Rājmaḥāl Hillman's Songs.

Brussels. L'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique.—Mémoires couronnés et autres mémoires, Tomes 24, 25 26, 1875.

Tome 24. *M. Melan*.—Note historique sur J. B. van Helmont à propos de la définition et de la théorie de la flamme. Opinions des anciens chimistes et physiciens sur la chaleur, le feu, la lumière et la flamme dans leurs rapports avec les idées et les travaux de van Helmont. *A. Perrey*.—Note sur les tremblements de terre en 1870, avec supplément pour 1869. Note sur les tremblements de terre en 1871, avec suppléments pour les années antérieures de 1843 à 1870.

Tome 25. *M. P. Mansion*.—Théorie des équations aux dérivées partielles du premier ordre. *J. C. Houzeau*.—Résumé de quelques observations astronomiques et météorologiques faites dans la zone surtempérée et entre les tropiques.

Tome 26. *A. Gillet*.—Mémoire sur le polymorphisme des champignons.

— Mémoires couronnés et Mémoires des savants étrangers. Tome 38, 1874. Tome 39, 1876.

Tome 38. *Dr. J. P. Nuel*.—Recherches sur l'innervation du cœur par le nerf vague, faites au laboratoire physiologique d'Utrecht.

— Mémoires. Tome 41, Pts. I, II, 1875.

Pt. I. *F. Plateau*.—Recherches sur les phénomènes de la digestion chez les insectes.

— Bulletins, 2nd Série, Tomes 37, 38, 39, 40; 1874, 1875.

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— Notices Biographiques et Bibliographiques, 1874.

Calcutta. Geological Survey of India. Records, Vol. IX, Pt. 2, 1876.

Dr. O. Feistmantel. Notes on the Age of some Fossil Flora in India. *R.*

Lydekker.—Description of a Cranium of *Stegodon Ganesa*, with notes on the sub-genus and allied forms. *H. B. Medlicott*.—Note upon the Sub-Himalayan Series in the Jamu Hills.

Leipsic. Der Deutsche Morgenländische Gesellschaft,—Abhandlungen, Band VI, No. 1.

M. l'Abbé P. Martin.—Chronique de Josué le Stylite, écrite vers l'an 515.

London. The Athenæum,—Pt. 580, April, 1876.

———. Nature,—Vol. 14, Nos. 845, 846, 847, 1876.

———. Geological Society,—Qt. Journal, Vol. 32, No. 126, May, 1876.

———. The Royal Society,—Proceedings, Vol. 24, No. 168.

Dr. U. Pritchard.—The Organ of Corti in Mammals. *C. S. Bates.*—On the Development of the Crustacean Embryo, and the Variations of form exhibited in the Larvæ of 38 Genera of *Podophthalmia*. *C. Meldrum.*—On a Secular Variation in the Rainfall in connection with the Secular Variation in amount of Sun-spots.

———. The Royal Astronomical Society,—Monthly Notices, Vol. 36. No. 6, August 1876.

———. The Statistical Society.—Journal, Vol. 39, Pt. I, March 1876.

J. Dun.—The Banking Institutions, Bullion Reserves, and Non-Legal-Tender Note Circulation of the United Kingdom Statistically investigated. *M. E. Grant-Duff.*—Opening Address of the President of the Department IV, "Economy and Trade," of the National Association for the Promotion of Social Science at the 19th Annual Congress held at Brighton in October, 1875.

Pisa. Società Toscana di Scienze Naturali. Atti. Vol. I, fas. 3.

Rurki. Professional Papers on Indian Engineering,—Vol. 5, No. 21, 2nd Series, July 1876.

Experiments on Strength of Indian Cements. Drainage of Madras.

Vienna. Der Anthropologische Gesellschaft,—Mittheilungen. Band V. Nr. 10.

MISCELLANEOUS PRESENTATIONS.

CALDWELL, REV. ROBERT. A Comparative Grammar of the Dravidian or South Indian Family of Languages.

HOME DEPARTMENT, GOVERNMENT OF INDIA.

PILCHER, SURGEON-MAJOR J. G. Report of the Sanitary Commission for Bengal, for 1875.

BEATSON, DR. J. FULLARTON. Report on the Calcutta Medical Institutions, for 1875.

Report of the Calcutta Court of Small Causes, for 1875-76.

GOVERNMENT OF BENGAL.

Report on the Administration of the Madras Presidency during the year 1874-75.

GOVERNMENT OF MADRAS.

BÜHLER DR. G. Report on Sanskrit MSS. 1874-75.

GOVERNMENT OF BOMBAY.

ATKINSON, EDWIN, T. Statistical Description, and Historical Account of the North-Western Provinces of India, Pt. I,—Agra Division.

GOVERNMENT OF THE N. W. PROVINCES.

Report on the working of the Government Charitable Dispensaries in the Central Provinces for the year 1875.

Report on the working of the Registration Department in the Central Provinces for the year 1875-76.

Report, with the Chief Commissioner's Review, on the Stamp Revenue of the Central Provinces for the year 1875-76.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Report of the Operations for 1875 of the British Indian Association.

THE HON. SECY., BRITISH INDIAN ASSOCIATION

PERIODICALS PURCHASED.

Göttingen. Göttingische Gelehrte Anzeigen, Nos. 15 to 18 Nachrichten No. 9, 1876.

Die Aechtheit der moribitischen Alterthümer geprüft von Prof. E. Kautzsch und Prof. A. Socin in Basel.

London. The Academy, Nos. 215 to 219, 1876.

———. The Annals and Magazine of Natural History, Vol. 17, No. 101, May 1876.

Dr. A. Gunther.—Notes on the Mode of Propagation of some Ceylonese Tree-Frogs, with Description of two new Species. Description of a new Frog from North-eastern Asia.

———. The London, Edinburgh, and Dublin Philosophical Magazine, Fifth Series, Vol. 1, No. 5.

R. Sabine.—On a Method of Measuring very small Intervals of Time. *O. J.*

Lodge.—On some Problems connected with the flow of Electricity in a Plane.

J. M. Gauguain.—The Influence of Temperature on Magnetization.

———. The Messenger of Mathematics, No. 60, New Series, April, 1876.

W. M. Hicks.—Practical Method of modelling the Wave Surface.

———. The Numismatic Society's Journal, Pt. 1, New Series, No. 61, 1876.

———. The Journal of the Society of Arts. Nos. 1223 to 1226, 1876.

No. 1223, *Capt. D. Galton.*—On Sanitary Progress in India.

No. 1224, Health and Sewage of Towns.

No. 1225, *W. T. Thornton.*—Irrigation works in India with special reference to their Remunerativeness.

New Haven. The American Journal of Science and Arts, Vol. XI, No. 64, April, 1876.

N. W. Wright.—On the Gases contained in Meteorites. *S. Newcomb.*—Review of Croll's Climate and Time with especial reference to the Physical Theories of Climate maintained therein.

Paris. Annales de Chimie et de Physique, 5th Series, Tome VII, Avril, 1876.

M. Eug. Visserand.—De l'action du froid sur le lait et les produits qu'on en tire.

Paris. Comptes Rendus, Tome 82, Nos. 16—19, 1876.

No. 16. *M. Faye*.—Sur l'orientation des arbres renversés par les tornados ou les trombes. *M. Marié-Davy*.—Note sur l'ozone de l'air atmosphérique.

No. 17. *M. Boussingault*.—Sur la végétation des plantes dépourvues de chlorophylle. *M. Daubrée*.—Expériences faites pour expliquer les alvéoles de forme arrondie que présente très-fréquemment la surface des météorites. *M. L. Larbë*.—Note relative à un fait de gastrotomie pratiquée pour extraire un corps étranger (fourchette) de l'estomac. *M. Th. Schloising*.—Sur les échanges d'ammoniaque entre les eaux naturelles et l'atmosphère. *M. Marey*.—Des variations électriques des muscles et du cœur en particulier, étudiées au moyen de l'électromètre de M. Lippmann. *M. Ch. Dramu*.—Sur la recherche chimicolégale de l'arsenic. *M. Bertol*.—Procédé pour prendre l'empreinte des plantes.

No. 18. *M. L. Smith*.—Recherches sur les composés du carbone pur dans les météorites. *M. Bouchelette*.—Sur la transmission des courants électriques par dérivation au travers d'une rivière.

No. 19. *M. L. Pasteur*.—Note sur la fermentation à propos des critiques soulevées par les Drs. Bredig et Traub. *M. Th. Schloising*.—Sur les échanges d'ammoniaque entre l'atmosphère et la terre végétale. *M. J. Dogiel*. Anatomie du cœur des Crustacés.

———. Journal des Savants, Avril, 1876.

Paut de Courteille.—Dictionnaire arabe-français.

———. Mélanges d'Archéologie Egyptienne et Assyrienne. Tome III, Fas. I.

———. Revue Archéologique, Avril, 1876.

———. Revue Critique, Nos. 17, 18, 19, 1876.

No. 19. *J. Budé*. Tâlib Kitâh al Fâsh.

———. Revue des Deux Mondes, Tome 15, Pts. I, II, 1876.

Pt. I. *M. L. Simonin*.—Les applications industrielles de la chaleur solaire: la machine de Tours. *M. E. Blanchard*.—La voix chez l'homme et chez les animaux.

Pt. II. *M. R. Radau*.—La constitution physique du Soleil d'après de récentes recherches.

———. Revue et Magasin de Zoologie, 3me Serie, Tome 4, No. 2, 1876.

BOOKS PURCHASED.

ANDERSON, JOHN, DR. Mandalay to Momiën: A Narrative of the two Expeditions to Western China of 1868 and 1875 under Colonel Edward B. Sladon, and Colonel H. Brown. Royal 8vo. London, 1876.

BÖHTLINGK, O. DR. Zur Kritik und Erklärung verschiedener indischer Werke. 8vo. St. Petersburg.

HOOKE, J. D. DR. The Flora of British India, Vol. I. Royal 8vo. London, 1875.

SCHUTZENBERGER, P. On Fermentation. 8vo. London, 1876.

The Oriental Sporting Magazine, from June, 1828 to June, 1833, Vols. I and II. Royal 8vo. London, 1873.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR NOVEMBER, 1876.

The Monthly General Meeting of the Society was held on Wednesday, the 15th November, at 9 o'clock P. M.

H. BLOCHMANN, Esq., M. A., in the Chair.

The minutes of the last Meeting were read and confirmed.

The following presentations were announced:—

1. From the Government of India, Foreign Dept.—

(1.) Memorandum descriptive of the route between Sohar and El Bereymee in Oman, with route map. By Lieut.-Colonel S. B. Miles, Political Agent, Muscat.

(2.) Report by Surgeon C. T. Peters on the Hot Springs of Bosher, a town about 15 miles from Muscat.

2. From the Government of Bengal, a copy of Dr. W. W. Hunter's Statistical Account of Bengal, in 5 volumes.

3. From the Right Hon'ble the Secretary of State for India, a copy of "The Commentaries of the great Afonso d'Albuquerque, second Viceroy of India," by W. de Gray Birch, published by the Hakluyt Society.

4. From the author, a copy of a work entitled "Notes on the History and Antiquities of Chaul and Basscin," by J. Gerson da Cunha.

5. From the author, a work entitled, "The District of Bákarganj its History and Statistics," by H. Beveridge, C. S.

6. From the author, a work entitled, "The Geographical Distribution of Animals and Plants. Pt. II, Plants in their wild state," by Dr. C. Pickering.

7. From M. Garcin de Tassy, a copy of his work entitled "Allegories, récits poetiques et chants populaires traduits de l'Arabe, du Persan, de l'Hindoustani, et du Turc."

8. From Nawab Nizám-ud-Daulah, former Diwán of Jodhpur Ráj, a copy of a work entitled "Gulistán-i-Lughát wa Shabistáu-i-Nukát."

9. From Prof. P. Tacchini, a copy of his Report on the Observation of the Transit of Venus at Muddapur in Lower Bengal.

The following gentlemen, duly proposed and seconded at the last Meeting, were balloted for and elected ordinary members—

Dr. H. Cayley.

Major M. M. Bowie.

Mr. George, A. Grierson.

Mr. H. Beveridge.

The following are candidates for ballot at the next Meeting—

1. Mr. J. C. Macdonald, Superintendent of Terai Perganahs, N. W. P., proposed by Mr. S. White, seconded by Capt. J. Waterhouse.

2. Captain E. Mockler, Political Agent, Gwádar, proposed by Mr. W. T. Blandford, seconded by Mr. H. Blochmann.

3. Lieut. G. S. Rodon, Royal Scots, Rá níkhet, N. W. P., proposed by Capt. J. Waterhouse, seconded by Mr. H. Blochmann.

4. Colonel G. B. Malleon, C. S. I., proposed by Dr. D. B. Smith, seconded by Mr. R. H. Wilson, C. S.

5. W. T. Webb, Esq., proposed by Mr. A. M. Nash, seconded by Mr. H. Blochmann.

The following gentlemen have intimated their desire to withdraw from the Society :—

Mr. R. A. Carrington.

Capt. E. W. D. La Touche.

Mr. J. Hector.

The CHAIRMAN announced that the Council had appointed Dr. J. Anderson a Member of the Council in the place of Col. J. F. Tennant resigned.

The CHAIRMAN laid before the Meeting the memorandum of the Council with reference to the repairs of the Society's building and the erection of shops, published in the August Proceedings, (p. 168,) which had been circulated to all the members of the Society for their votes on the two following propositions :

I. The erection of a dwarf wall and railings, and new servants' houses in place of the present boundary wall and godowns, at the estimated cost of Rs. 6,167.

II. The investment of a portion of the Society's capital in the erection of a shop or shops, on a waste part of the Society's compound at a cost of Rs. 12,000.

And said that the votes of the meeting would now be taken, and it would be necessary to appoint two Scrutineers to examine the votes.

Messrs. Gribble and Waldie kindly undertook the office of Scrutineers and, after examination of the votes, reported that, of 76 voters, all were in favour of Proposition I ; and that there were 58 in favour of Proposition II and 18 against it.

The CHAIRMAN drew attention to rule 33 of the Society's Bye-laws, and said that as the proposition was not one of alteration of the rules both propositions were carried.

Before and after the voting there was considerable discussion as to the propriety and desirability of erecting shops, and also on the desirability of giving an opportunity for the discussion, at a general meeting of the Society, of such questions as were then before the meeting, before circulating them to the general body of members. It was felt that under the present rules the Resident Members of the Society had no opportunity of discussing proposals emanating from the Council, and the votes of the non-resident members decided all such questions. It seemed therefore useless bringing them before a meeting at all.

In the course of the discussion, Mr. H. F. BLANFORD proposed the following resolution :

"That this meeting do not approve of the erection of shops on a portion of the Society's compound, and recommend the Council not to act on the power now vested in them by the general votes of the members."

Mr. R. H. WILSON seconded the resolution.

The CHAIRMAN explained that the proposal for erecting the shops had not originated with the Council, but as it was for the advantage of the Society the Council had thought it desirable to place it before the general body of members. It would not, however, be obligatory on the Council to erect the shops in consequence of the vote.

Dr. D. B. SMITH then proposed the following amendment :

"That the Council shall act in conformity with the powers vested in them by the general vote of the Society if they consider it necessary."

After some further discussion, Mr. Blanford withdrew his motion on the understanding that the question of the erection of the shops would receive further consideration by the Council, and that they would not be erected unless it was really necessary to increase the income of the Society by that means.

Dr. Smith thereupon withdrew his amendment.

The CHAIRMAN then laid before the meeting the proposed alterations in the Rules and commenced taking them one, by one with the object of making a few verbal alterations that had been suggested by absent members or might be suggested at the meeting.

Some of the members present objected to this method on the ground that a large majority having already sent in their votes in favour of the rules as proposed by the Council, it would only be a useless waste of time going through them seriatim, as no alteration made by the meeting would be valid. It was therefore decided that the votes of members present should be taken for the rules as they stood.

Messrs. Gribble and Waldie again undertook the office of Scrutinisers and reported the result as follows:

	For.	Against.	No Vote.	Total.
Rule 1, ...	73	0	3	76
Rule 2, (a.) ...	71	1	4	76
" (b.) ...	72	0	4	76
" (c.) ...	72	0	4	76
Rule 3, (addl. clause), ...	65	6	5	76
Rule 5, A. ...	71	0	5	76
" B. ...	71	0	5	76
" C. ...	70	1	5	76
Rule 9, A. ...	62	10	4	76
Compounding Rules, Clause 1, ...	70	2	4	76
" " 2, ...	71	1	4	76
" " 3, ...	71	1	4	76
" " 4, ...	70	2	4	76
" " 5, ...	71	1	4	76
Rule 13, A. ...	67	5	4	76
" B. ...	66	6	4	76
" C. ...	68	4	4	76
Rule 14, A. ...	70	2	4	76
" B. ...	70	2	4	76
" C. ...	71	1	4	76
" D. ...	70	2	4	76
" E. ...	71	1	4	76
Rule 15, ...	69	4	3	76
Rule 20, ...	67	3	6	76
Rule 22, (f.) ...	70	3	3	76
Rule 22, (addl. clause g.) ...	63	7	6	76
Rule 26, (addl. clause), ...	67	4	5	76
Rule 28, (c.) ...	65	5	6	76
Rule 28, (addl. clause after c.) ...	65	5	6	76
Rule 29, ...	70	1	5	76
Rule 32, (c.) ...	69	0	7	76
Rule 33, ...	69	2	5	76
Rule 34, ...	67	3	6	76
Rule 36, A. ...	69	0	7	76
Rule 38, Clause 1, ...	71	1	4	76
" " 2, ...	71	1	4	76
" " 3, ...	71	1	4	76
" " 4, ...	70	2	4	76
" " 5, ...	71	1	4	76
" " 6, ...	72	0	4	76
New Rule, (Miscellaneous) ...	66	2	8	76

The CHAIRMAN announced that all the proposed changes in the Society's Bye-laws had been carried.

Mr. H. F. BLANFORD gave notice that in accordance with Rule 29, Clause (d) he would move at the next meeting the following addition to the present rule 33 :

" If the question to be submitted to a general vote be one falling under Section c of Rule 32, it shall, in the first instance, be submitted for discussion at an ordinary monthly meeting, and the votes of the members present shall be taken whether the proposal shall be recommended or otherwise. A full report of the discussion shall be circulated with the voting papers."

The following communications have been received :—

1. Fifth List of Birds from the N. E. Frontier of India. By Major H. H. Godwin-Austen.

2. Descriptions of new Species of *Blattidae* belonging to the Genus *Panosthia*. By J. Wood-Mason.

LIBRARY.

The following additions have been made to the Library since the Meeting held in August last.

TRANSACTIONS, PROCEEDINGS, AND JOURNALS, presented by the respective Societies or Editors.

Calcutta. The Calcutta Journal of Medicine, Vol. VIII. Nos. 1 to 3, 1876.

Bombay. The Vedārthayātna, or an attempt to interpret the Vedas, Nos. 4, 5.

———. The Indian Antiquary. Vol. V., Pts. 57 and 58. August and September, 1876.

Pt. 57. *E. Rehatsek*.—The twelve Emāms. *Rev. J. F. Kearns*.—*Silpa Sāstra*. *M. J. Walhouse*.—Archæological Notes. *Dr. F. Kulhorn*.—On the Mahābhāshya. *Sir W. Elliot*.—On the Noubat. *G. H. Johns*.—Notes on some little-known Baulha excavations in the Puná Collectorate.

Pt. 58. Prof. Keum's versions of some of the Asoka Inscriptions. *G. Bühler*.—A Grant of Chittarajadeva Mahāmandalésvara of the Konkana.

———. Bombay Branch of the Royal Asiatic Society.—Journal, Vol. XII., No. 83., 1876.

J. F. Fleet.—Sanskrit and old Canarese Inscriptions relating to the Yādava Kings of Dēvāgiri, edited from the originals, with translations. *Bhau Dājī*.—Report on some Hindu Coins. *Dr. G. Marchesetti*.—On a pre-historic Monument of the Western Coast of India.

Berlin. * Königl. Preussische Akademie der Wissenschaften.—Monatsbericht. Mai 1876.

Schott.—Über gewisse Thiernamen mit besonderer Rücksicht auf das sogenannte tatarische Sprachgebiet.

Cherbourg. Société Nationale des Sciences Naturelles de Cherbourg.—Memoires. Tome XIX.

London. The Anthropological Institute.—Journal, Vol. 6, No. 1, July, 1876.

A. W. Franks.—On stone Implements from Honduras. *H. H. Howorth.*—The Arian Nomads. *E. B. Tylor.*—Remarks on Japanese Mythology.

———. The Athenæum,—Pts. 581 and 582, May and June, 1876.

———. The Geographical Magazine,—Vol. III, Nos. 7 and 8.

No. 7. *Fr. Ad. de Riepfors.*—The Andaman Islands.

No. 8. The Basin of the Ob and Yenisei Rivers. *Prof. H. H. Giglioli.*—Dr. Beccari's third visit to New Guinea.

———. Nature, Vol. 14, Nos. 348 to 354, 1876.

———. Royal Astronomical Society,—Monthly Notices, Vol. 30, Nos. 7 and 8, 1876.

No. 7. *Major Palmer.*—On recent American Determinations of Geographical Positions in the West Indies and Central America. *Mr. Dunkin.*—Note on the discovery of four Minor Planets, (160) *Una*, (161), (162), and (163).

———. Royal Geographical Society,—Journal, Vol. 45, 1875.

E. L. Orenham.—On the Inundations of the Yang-tse-kiang. *C. R. Markham.*—Travels in Great Tibet, and trade between Tibet and Bengal. *Major H. Wood.*—Notes on the Lower Amú-darya, Syr-darya and Lake Aral, in 1874.

———. Proceedings, Vol. XX, No. 4, 1876.

Elias.—Visit to the Valley of the Shueli, Western Yunnan. *Markham.*—Afghan Geography. *Stone.*—Recent explorations in the interior of New Guinea from Port Moresby. Description of the Country and Natives of Port Moresby and neighbourhood, New Guinea. *D'Alberty.*—Remarks on the Natives and Products of the Fly River, New Guinea.

———. Royal Society.—Proceedings, Vol. 24, No. 169.

Dr. J. W. Legge.—An inquiry into the cause of the slow Pulse in Jaundice.

———. Statistical Society.—Journal, Vol. 39, Pt. II., June, 1876.

Dr. F. J. Mouat.—On International Prison Statistics. The Census of British India of 1871-72.

Moscow. Société Impériale des Naturalistes de Moscou.—Bulletin, Nos. 3 et 4, 1875.

Munich. Königl. Bayerische Akademie der Wissenschaften.—Philosophisch-Philologische und Historische Classe. Sitzungsberichte, Band. II, Heft III, 1875.

E. Schlagintweit.—Die geographische Verbreitung der Volkssprachen Ostindiens.

Palermo. Società degli Spettroscopisti Italiani.—Memorie, Dispensa 6ª, e 7ª, Luglio e Giugno, 1876.

Disp. 6. *P. Tacchini.*—Osservazioni solari spettroscopiche e dirette fatte all'osservatorio di Palermo nel mese di maggio 1876.

- Disp. 7. *P. Tschini*.—Osservazioni solari spettroscopiche o dirette fatte all'osservatorio di Palermo nei mesi di Giugno e Luglio 1876. *A. Serpierti*.—La luce zodiacale studiata nelle osservazioni di G. Jones.
- Paris. Société de Géographie.—Bulletin, Mai et Juin, 1876.
- Juin. *E. T. Hamy*.—Note sur les collections d'histoire naturelle recueillies par M. le Dr. Harmant pendant son voyage au Cambodge.
- Prague. K. K. Sternwarte zu Prag.—Astronomische, Magnetische und Meteorologische Beobachtungen im Jahre 1875.
- Schaffhausen. Schweizerische Entomologische Gesellschaft.—Mittheilungen, Vol. IV, Heft No. 9, 1876.
- St. Petersburg. l'Académie Impériale des Sciences de St. Petersburg.—Tableau général méthodique et alphabétique des matières contenues dans les publications de l'Académie depuis sa fondation. 1^{re} partie.
- Trieste. Società Adriatica de Scienze naturali.—Bollettino, No. 1, Annata II.

BOOKS AND PAMPHLETS

presented by the Authors.

- BEVERIDGE, H. The District of Bákarganj, its History and Statistics. 8vo., London, 1876.
- GERSON DA CUNHA, J. Notes on the History and Antiquities of Chaul and Bassein. 8vo., Bombay, 1876.
- GARCIN DE TASSY, M. Allégories, récits poétiques et chants populaires traduits de l'Arabe, du Persan, de l'Hindoustani et du Turc. 2nd Ed. Royal 8vo., Paris, 1876.
- PRANNATH SARASWATI, PANDIT. "Annexation *versus* Equity," a Letter. Calcutta, 1876.
- WEBER, A. DR. Indische Studien, Vol. 14, Pts. I, II, III, 8vo., Leipzig, 1876.

MISCELLANEOUS PRESENTATIONS.

- The Yajar Veda Sanhita. Nos. 18 to 21.
- A new Hindustani—English Dictionary, by Dr. S. W. Fallon, Pt. IV. 1876.
- Papers relating to the Selection and Training of Candidates for the Indian Civil Service.

HOME DEPARTMENT, GOVERNMENT OF INDIA.

A Statistical Account of Bengal, Vols. I to V, by Dr. W. W. Hunter.

GOVERNMENT OF BENGAL.

Report on the Administration of the Madras Presidency during the year 1874-75.

Annual Report of the Madras Medical College. Session 1874-75. No. 47.

GOVERNMENT OF MADRAS.

Archæological Survey of Western India, No. 5. Translations of Inscriptions from Belgaum and Kaladgi Districts in the Report of the First Season's Operations of the Archæological Survey of Western India, by J. F. Fleet, Esq., C. S., and of Inscriptions from Kathiawad and Kachh, by Hari Vaman Limaya, B. A.

Report on Sanskrit MSS. 1874-75, by Dr. G. Bühler.

GOVERNMENT OF BOMBAY.

Report on the Gaols of the Central Provinces for the year 1875.

Report, with the Chief Commissioner's Review, on Education in the Central Provinces, for the year 1875-76.

Report, with the Chief Commissioner's Review, on the Forest Administration of the Central Provinces for the year 1875.

Annual Report of the Sanitary Commissioner of the Central Provinces for the year 1875.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Records of the Geological Survey of India. Vol. IX. Pt. 3, 1876.

DEPARTMENT OF REVENUE, AGRICULTURE AND COMMERCE.

The Rámáyana, Vol. V, Nos. 7 and 8.

BABU HEM CHANDRA BHATTACHARJEE.

Minutes of the Annual General Meeting of the Trustees of the Indian Museum, for the year 1875-76.

THE TRUSTEES OF THE INDIAN MUSEUM.

The Economic Museum. A paper read by the Hon. Mr. J. B. Phear before the Bengal Social Science Association on the 24th July, 1876.

THE SECRETARY ECONOMIC MUSEUM.

HAAS, ERNST, DR. Catalogue of Sanskrit and Pali Books in the British Museum.

THE TRUSTEES OF THE BRITISH MUSEUM.

STENZLER, A. F. The Institutes of Gautama.

THE SANSKRIT TEXT SOCIETY.

Catalogus Codicum Latinorum Bibliothecæ Regiæ Monacensis, Tomi, II, Pars. II.

ACADEMIE ROYALE DES SCIENCES DE MUNICH.

KAZIMIRSKI, A. DE B. Spécimen du Divan de Menoutchchri, poète Persan du 5^me siècle de l'Hégire.

M. C. SCHEFER, PARIS.

PERIODICALS PURCHASED.

Berlin. Journal für die reine und angewandte Mathematik. Band 82, Heft 4.

Hamburger.—Zur Theorie der Integration eines systems von n linearen partiellen Differentialgleichungen erster Ordnung mit zwei unabhängigen und n

abhängigen Veränderlichen. *M. R. Lepschitz*.—Généralisation de la théorie du rayon osculateur d'une surface. *Max Simon*.—Ganzzahlige Multiplication der elliptischen Functionen in Verbindung mit dem Schliessungsproblem.
Calcutta. The Indian Annals of Medical Science, Vol. XVIII., No. 86.
July, 1876.

Drs. T. R. Lewis and D. D. Cunningham.—The Fungus Disease of India.

———. The Indian Medical Gazette, Vol. XI, Nos. 8 and 9, 1876.

———. The Calcutta Review, No. 126, October, 1876.

Prof. A. E. Gough.—Ancient Indian Metaphysics.

Giessen. Jahresbericht über die Fortschritte der Chemie für 1874, Heft 3.

Göttingen. Göttingische gelehrte Anzeigen, Nos. 19 to 24: Nachrichten, No. 10, 1876.

Leipsic. Poggendorff's Annalen der Physik und Chemie, Nos. 1 to 8, 1876.

No. 6. *P. Silow*.—Ueber die Dielektricitätsconstante der Flüssigkeiten.

No. 7. *F. Kohlrausch*.—Experimental-Untersuchung über die elastische Nachwirkung bei der Torsion, Ausdehnung, und Biegung. *G. Berthold*.—Notizen zur Geschichte des Radiometers. *H. Helmholtz*.—Bericht betreffend Versuche über die elektromagnetische Wirkung elektrischer Convection.

No. 8. *R. Finkener*.—Ueber das Radiometer von Crookes. *Gramme*.—Ueber eine magneto-elektrische Maschine mit continuirlichem Strom.

London. The Academy, Nos. 220 to 225, 1876.

———. The Annals and Magazine of Natural History.—Vol. 17, No. 102 and Vol. 18, No. 103, June, July, 1876.

No. 102. *W. B. Carpenter*.—Notes on Otto Hahn's "Microgeological Investigation of *Eozoon canadense*." *A. G. Butler*.—Preliminary Notice of new species of *Arachnida* and *Myriopoda* from Rodriguez, collected by Messrs. G. Gulliver and H. H. Slater. *Prof. C. Semper*.—On the Identity in Type of the Annelids and Vertebrates. *M. A. Giard*.—Note on the Embryogeny of the *Tunicata* of the Group *Lucia*. *A. Agassiz*.—On Huxley's Theory (*Alluogenensis*) of the Genetic Connexion between the *Geryoniidae* and *Xginiidae*. *M. N. Joly*.—On the Embryogeny of the *Ephemera*, especially that of *Ealingenia virgo*. Oliv. *M. J. B. Schnetzler*.—Protection of Horbaria and Entomological Collections from Insects by means of Sulphide of Carbon. *Prof. P. B. Wilson*.—Silica of Grasses and other Plants carried up as Diatoms or other Siliceous Grains and not in Solution or as Soluble Silicates.

No. 103. *Dr. G. Lindström*.—On the Affinities of the *Anthozoa Tabulata*. *J. W. Dawson*.—*Eozoon canadense*, according to Hahn. *E. A. Smith*.—Descriptions of two new species of *Ophiocoma*. *Dr. N. Severtzoff*.—The Mammals of Turkistan. *Dr. H. A. Nicholson*.—Supposed Laurentian Fossil. *J. Wood-Mason*.—Description of a new Rodent from Central Asia. *Prof. P. M. Duncan*.—On the Animal of *Millepora alcicornis*. *G. C. Wallich*.—Deep-sea researches.

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H. E. Dresser.—Notes on Severtzoff's "Fauna of Turkistan." *H. Seebohm* and *J. A. H. Brown*.—Notes on the Birds of the Lower Petchora. *J. H. Gurney*.—Notes on a "Catalogue of the Accipitres in the British Museum, by R. B. Sharpe. *P. L. Selater*.—On Recent Ornithological Progress in New Guinea

T. Salvadori.—On *Sericulus xanthogaster*, Schl. and *Xanthomelus aureus*. (Linn). Notices of recently published Ornithological works.

London. The London, Edinburgh, and Dublin Philosophical Magazine, Fifth Series, Vol. I, Nos. 6, 7, 8.

No. 7. *Prof. G. Tschermak*.—The Formation of Meteorites and Volcanic Agency. *L. Schwendler*.—On the General Theory of Duplex Telegraphy.

No. 8. *R. H. M. Bosanquet*.—On a new Form of Polariscopes, and its application to the Observation of the Sky. *Rev. R. Abney*.—Remarkable Atmospheric Phenomena in Ceylon.

———. Journal of the Society of Arts.—Nos. 1227 to 1234, 1876.

No. 1227. Health and Sewage of Towns. *F. J. Bramwell*.—Railway safety appliances.

No. 1228. *Dr. G. Birdwood*.—Competition and its effect on Education, with especial reference to the Indian Civil Service.

No. 1232. Indian and Colonial Museum.

No. 1233. Lightning Conductors.

———. Quarterly Journal of Microscopical Science.—No. 53, July, 1876.

G. Thin.—On the Formation of Blood-vessels as observed in the Omentum of young Rabbits. On the structure of Muscular Fibre. *J. F. Bell*.—An Account of the Recent Researches into the History of the Bacteria, made by and under the direction of Prof. Cohn. *E. R. Lankester*.—Note on *Bacterium rubescens* and *Clathrocystis roseo-persicina*. *W. Archer*.—Résumé of Recent Contributions to our knowledge of "Freshwater Rhizopoda." Pt. I. *Elli-soa*. *F. Darwin*.—The Process of Aggregation in the Tentacles of *Drosera rotundifolia*. *E. R. Lankester*.—Remarks on the Shell-gland of *Cycas* and the *Plumula* of Linnaeus. *H. N. Mosley*.—Note on Mihakowicz's New Method of Imbedding.

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Lord Macaulay. The Orkneys and Rude Stone Monuments.

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———. Zoological Record, Vol. XI, 1874.

New Haven, U. S.—The American Journal of Science and Arts.—Vol. XI, Nos. 65 and 66, May and June, 1876.

No. 65. *J. Troubridge*.—On the effect of Thin Plates of Iron used as Armatures for Electro-Magnets, and a new form of Induction Coil.

No. 66. *C. A. Young*.—Note on the Duplicity of the "1474" line in the Solar Spectrum. *J. L. Smith*.—Researches on the solid Carbon Compounds in Meteorites. *L. Troughton*.—Physical Observations on Saturn. *R. W. McFarland*.—Curve of Eccentricity of the Earth's Orbit. *M. C. Lea*.—Notes on the Sensitiveness of Silver Bromide to the Green Rays as modified by the Presence of other Substances.

Paris. Annales de Chimie et de Physique,—5^{me} Série. Tome VIII, Mai et Juin 1876.

Mai. *M. Boussingault*.—Influence de la terre végétale sur la nitrification des matières organiques azotées employées comme engrais. *M. A. Muntz*.—Recherches sur les fonctions des champignons.

- Juin. *M. A. Glénard*.—Recherches sur l'alcaloïde de l'ipécacuanha. *M. E. H. Amagat*.—Recherches sur l'élasticité de l'air sous de faibles pressions. *M. Bertin*.—Sur le radiomètre de Crookes.
- Paris. Journal des Savants. Mai, Juin, 1876.
- Juin. *M. M. J. Saint-Hilaire*.—Inspection archéologique de l'Inde.
- . Revue Archéologique. Mai, Juin, 1876.
- . Revue des Deux Mondes,—Tome 15, Nos. 3 et 4; Tome 16, No. 1, 1876.
- . Revue et Magasin de Zoologie,—3^e Serie, Tome 4, Nos. 3 et 4. 1876.
- Fieber et Rieber*.—Cicadines d'Europe.
- . Comptes Rendus,—Tome 82, Nos. 20—26; Tome 83, No. 1, 1876.
- No. 20. *M. H. Debray*.—Sur la présence du sélénium dans l'argent d'affinage. *M. Dogiel*.—Sur le cœur des Crustacés. *M. Bedoin*.—Sur les propriétés antiseptiques du borax.
- No. 21. *M. A. Angot*.—Sur les images photographiques obtenues au foyer des lunettes astronomiques. *M. A. Girardin*.—Note sur quelques propriétés physiques des eaux communes. *M. S. de Luca*.—Sur le plomb contenu dans certaines pointes de platine employées dans les paratonnerres. *M. Onimus*.—Modifications dans les piles électriques rondant leur construction plus facile et plus économique. *M. Th. Schloësing*.—Sur la fixation de l'azote atmosphérique par la terre végétale. *M. G. Carlet*.—Sur l'anatomie de l'appareil musical de la Cigale.
- No. 22. *M. A. Leduc*.—Examen de l'action mécanique possible de la lumière. Étude du radioscope de *M. Crookes*. *M. W. de Fouville*.—Sur le radiomètre de *M. Crookes*. *M. Ch. Lamey*.—Sur la théorie de la périodicité undécennale des taches du Soleil.—*M. Oré*.—Anesthésie par la méthode des injections intra-veineuses de chloral. Amputation de la cuisse; insensibilité absolue; sommeil consécutif pendant six heures; guérison sans aucun accident.
- No. 23. *M. A. Leduc*.—Examen de l'action mécanique possible de la lumière. Étude du radioscope de *M. Crookes*. *M. Ed. Becquerel*.—Rapport sur plusieurs mémoires de *M. Allard*, relatifs à la transparence des flammes et de l'atmosphère et à la visibilité des phares à feux scintillants. *M. A. Angot*.—Sur les images photographiques obtenues au foyer des lunettes astronomiques. *M. B. F. Michel*.—Sur les inconvénients que présente l'emploi d'un cable en fils de cuivre comme conducteur de paratonnerre. *M. P. Cuzeneuve*.—Métallisation des substances organiques, pour les rendre aptes à recevoir les dépôts galvaniques.
- No. 24. *M. Cl. Bernard*.—Critique expérimentale sur la glycémie (suite). Des conditions physico-chimiques et physiologiques à observer pour la recherche du sucre dans le sang. *M. Th. du Moncel*.—Sur les transmissions électriques à travers le sol. *M. Tacchini*.—Nouvelles observations relatives à la présence du magnésium sur le bord du soleil.
- No. 25. *M. Cl. Bernard*.—Critique expérimentale sur la glycémie (suite). *M. A. Leduc*.—Examen des nouvelles méthodes proposées pour la recherche de la position du navire à la mer. *M. J. D. Tholosan*.—La peste en Asie et en

Afrique en 1876 : mesures prophylactiques. *M. J. M. Gauguain*.—Influence de la température sur l'aimantation. *M. Woilles*.—Sur le spirophore, appareil du sauvetage pour les asphyxiés, principalement pour les noyés et les enfants nouveau-nés.

No. 26. *M. G. A. Hirn*.—Sur le maximum de la puissance répulsive possible des rayons solaires. *M. A. Lédieu*.—Nouvelles considérations expérimentales sur le radiomètre de *M. Crookes*. *M. P. Boiteau*.—Propriétés communes aux canaux, aux rivières et aux tuyaux de conduite à régime uniforme. *M. J. L. Smith*.—Sur l'arragonite observée à la surface d'une météorite. Sur les combinaisons de carbone trouvées dans des météorites. *M. A. Houzeau*.—Sur l'emploi du chlorure de calcium dans l'arrosage des chaussées de nos promenades et de nos jardins publics. *MM. F. Filtz et E. Ritter*.—Recherches expérimentales sur l'action de l'aniline, introduite dans le sang et dans l'estomac.

No. 1. *MM. l'auteur et P. Joubert*.—Sur le fermentation de l'urine. *M. Th. du Moncel*.—Troisième Note sur les transmissions électriques à travers le sol. *M. A. Lédieu*.—Examen des nouvelles méthodes proposées pour la recherche de la position du navire à la mer. *P. Secchi*.—Nouvelle série d'observations sur les protubérances et les taches solaires. *M. A. Cornu*.—Études de photographie astronomique. *M. G. Leclanché*.—Nouvelle pile au peroxyde de manganèse. *M. O. Damoiseau*.—Sur une nouvelle méthode de substitution du chlore et du brome dans les composés organiques. *M. E. Jacquemin*.—Recherches de la fuchsine dans les vins. *M. G. Tissandier*.—Analyse micrographique comparative du corpuscules ferrugineux atmosphériques et de fragments détachés de la surface des météorites. *M. G. Hayem*.—Des caractères anatomiques du sang dans les anémies.

BOOKS PURCHASED.

HOOKE, J. D. DR. *Himalayan Journals or Notes of a Naturalist in Bengal, the Sikkim, and Nepal Himalayas, the Khasia Mountains, &c.* Vols. I and II. 8vo. London, 1854.

THOMAS, E. *Records of the Gupta Dynasty. Illustrated by Inscriptions, Written History, Local Tradition, and Coins.* Royal 4to. London, 1876.

List of Sanskrit and other Manuscripts and Lithographed works purchased for the Society.

Sanskrit MSS. on Paper Pothies. Subjects.

1617. Dharmādhvābodha. By Nimbāditya, Smṛiti.
 1618. Śilpa Śāstra. By Sūtra-maṇḍana, Art.
 1619. Prāyaścitta-viveka, Smṛiti.
 1620. Ch'hāndogya-bhāṣya, Veda.
 1621. Vṛihad-dharma-purāṇa, Purāṇa.
 1622. Anumāna-dīdhiti, Nyāya.
 1623. Amṛita-vindūpanishad, Vedānta.
 1624. Nārāyaṇopanishad, „

1625. Shaṭ-prasni, Vedānta.
 1626. Nṛsiṅha-tāpani-upanishad, Purvārddha, "
 1627. Nṛsiṅha-tāpani-upanishad, Uttarārddha, "
 1628. Ātharvana Tāpanyupanishad-bhāshya, "
 1629. Ātharvana-purva-tāpanyupanishad, "
 1630. Nṛsiṅha-tāpanyupanishad-bhāshya, "
 1631. Taittirīya Saṅhitā, Veda.
 1632. Sāmāgrī-pratibandha-vichāra, Smṛiti.
 1633. Bhaṭṭi Kāvya, in Bengali Character, Poem.
 1634. Nyāya-pakṣatā, Nyāya.
 1635. Mūthuri Chintāmani, "
 1636. Anumāna Chintāmani, "
 1637. Chintāmani-rahasya, "
 1638. Kevalānvayī-rahasya, "
 1639. Saṅkṣa-pramāṇya, "
 1640. Pramāṇyavāda-ṭīkā, "
 1641. Anumāna-dīdhiti, "
 1642. Nyāya-tattva-bhāshya, "
 1643. Pramāṇa Khaṇḍa, "
 1644. A Nyāya work. (Unnamed).
Lithographs received on 10th March, 1875.
 1645. Laghu-sādhendū-śekhara, Grammar.
 1646. Praudha-manoramā, "
 1647. Jāgadīśi Pancha-lakṣhaṇa, Tippiṇī, Nyāya.
 1648. Mūthuri Pancha-lakṣhaṇa, Tippiṇī, "
 1649. Viśva-guṇa-darśana, Poem.
 1650. Yavana-jātaka, Astronomy.

Sanskrit MSS. on Palm-leaved Pothies.

1651. Kātantra Parisiṣṭa Ṭīkā, Grammar.
 1652. Tithi Tattva, Smṛiti.
 1653. Dāya Tattva, "
 1654. Śrāddha Tattva, "
 1655. Pratishṭhā Tattva, "
 1656. Āśauca-nirṇaya, "
 1657. " " (duplicate,) "
 1658. Karma-vipāka, "
 1659. Smṛiti-tattva, "
 1660. Daśamaskandha Ṭīkā, Purāṇa.
 —61. Viśṇu Purāṇa, "
 —62. Ayurveda, Medicine.
 —63. Chaitanya-chandrodaya, Drama.

1864. Rághava-pandavíya and Kirátarjuníya,Poem.
 —65. Vidvan-moda-taranginí,Philosophy.
 —66. Kshudra Kávyáni,Poems.
 —67. Dhátu-rúpa,Etymology.
 —68. A Work on Nyáya,
 —69. A Work in a ruined state,
 —70. A Telugu work,

Sanskrit MSS. on Palm leaves.

- 71. Sánti-sataka Tíká,Poems.
 —72. Súra Sataka Tíká, „
 —73. Śaṅkara's Átma-tattva-viveka,Vedānta.
 —74. Dhananjaya-vijaya Tíká,Poem.
 —75. Pingala Ch'handā,Versification.
 —76. Nitya Durgápuja, on the daily worship of Durgá, Smṛiti.
 —77. Práyaschitta-nirṇaya, „
 —78. Kautuka-sarvasva Nāṭaka,Drama.
 —79. Trikāṇḍa-kosha Tíká,Lexicon.
 —80. Ayodhyá-máhātma, Purāṇa. By Unápati Sarmá, (on paper.)
 —81. Śabdárṇava. By Raghumani. Sanskrit Dic-
 tionary in 5 Vols. Much decayed.
 —82. Aitarcya Aranyaka,Veda in 5 Parts.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR DECEMBER, 1876.

The Monthly General Meeting of the Society was held on Wednesday, the 6th instant, at 9 o'clock P. M.

The Hon. E. C. BAYLEY, C. S. I., President, in the Chair.

The minutes of the last meeting were read and confirmed.

The following presentations were announced—

1. From Prince Rama Varna, First Prince of Travankor, a copy of the Report on the Census of Travankor for 1874-75.

2. From Professor C. Schefer, of the Ecole des langues Orientales vivantes, Paris, a valuable collection of Oriental Works, partly published by the professors of the Ecole, the particulars of which will be found in the Library List.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members—

J. C. Macdonald, Esq.

Capt. E. Mockler.

Colonel G. B. Malleson, C. S. I.

W. T. Webb, Esq.

Lieut. G. S. Rodon.

The following is a candidate for ballot at the next meeting—

Kumara Radha Kishore Deb, Juvrúj of Hill Tiperah, proposed by Mr. T. E. Coxhead, seconded by Capt. J. Waterhouse.

In pursuance with the notice given at the last meeting, Mr. H. F. BLANFORD proposed that the following addition be made to Rule 38.

"If the question to be submitted to a general vote be one falling under Section (c) of Rule 32, it shall in the first instance be submitted for discussion at an ordinary monthly meeting, and the votes of the members present shall be taken whether the proposal shall be recommended or

otherwise. A full report of the discussion shall be circulated with the voting papers."

In the absence of Mr. R. H. Wilson, Dr. Waldie seconded the proposal.

Mr. BLANFORD said that the object of the addition he proposed was to ensure the discussion of important questions at a general meeting of the Society before they were circulated for the votes of the general body of members. He understood that there was an impression that he intended to stop the reference of such questions to the whole body of members in the case of the vote of the meeting being against it—but such was not his intention, and in such a case it would still be open for the Council to circulate the question for the votes of non-resident members, but accompanied by a report of the discussion at the meeting.

CAPT. WATERHOUSE said—that while quite agreeing with the principle of Mr. Blanford's proposal, he thought that the addition to the rule might be worded differently, so as to indicate definitely the procedure to be adopted in order to ensure the discussion at a general meeting before the circulation of the voting papers, because at present all such questions were brought before a general meeting before being circulated. With reference to the proviso that a full report of the discussion should be circulated with the voting papers—he thought it was impracticable, unless the services of a short-hand writer were engaged for the purpose, and even then it might involve a great deal of useless printing. A short statement of the objections, would, he thought, be better. He would therefore propose the following amendment :

" If the question to be submitted to a general vote be one falling under Clause (c) of Rule 32, the Council shall cause to be sent to every Resident Member, at least 48 hours before a general meeting, a printed circular, setting forth the nature of the proposal to be brought forward and the reasons for it, in order that it may be duly discussed at the meeting ; and should the general sense of the meeting be opposed to such proposal, a statement of the objections raised against it shall also be circulated with the voting papers."

Mr. BLOCHMANN seconded the amendment.

Mr. BLANFORD objected to the amendment on the ground that it did not provide for the discussion of the question before the issue of the voting papers.

After some further discussion the PRESIDENT observed that the object of the original motion and of the amendment seemed to be much the same, and that perhaps before the next meeting Mr. Blanford and Capt. Waterhouse could arrange between themselves as to the form the additional rule should take, and the Council would then circulate it to the Society in the usual way.

The **PRESIDENT** announced, on the part of the Council, that with reference to what passed at the last meeting regarding the erection of shops on a waste portion of the Society's compound, the Council had resolved that in any case the shops should not be built on the site proposed, at the corner of Park Street and Chowringhee, though they reserved the power of building them at the other corner in Park Street if the interests of the Society should require it.

COLONEL THUILLIER said—With reference to what had just been announced by the President, as to the intention of the Council in regard to the proposed erection of shops on a portion of the Society's ground in the south-east corner of the compound in Park Street, he desired to bring to the notice of the present meeting his very emphatic protest against the disposal of any of the ground belonging to the premises of the Society for the erection of shops with a street frontage, as a financial speculation.

He considered the question of shops in such a desirable situation, and in close contact with the Society's house, altogether prohibitory on many accounts, entailing, as such erections undoubtedly would, an unending source of inconvenience and difficulty in harbouring natives of inferior description about the premises, and in entirely spoiling the fine frontage towards the Maidan and Park Street, which, when properly opened out by the contemplated improvements, would necessarily afford to the house they were so fortunately situated in, the superiority of aspect and prominence which it required and deserved.

The erection of shops as a speculation on the part of the Society, he deemed utterly foreign to the position, character, and objects of the Society; and their erection in such close vicinity to the house, in such a confined compound, would obstruct light and ventilation, and be a terrible eyesore and annoyance when built.

Understanding that the sense of the previous meeting was entirely in accordance with his views on this very important question, he entreated the Council to weigh it well before acceding to it their support—he had therefore entered his protest on the minutes of Proceedings of the last Council meeting, against the measure, and he earnestly trusted nothing of the sort would be actually undertaken to the detriment of the real interests of the Society.

The **PRESIDENT** announced that subscriptions to the amount of Rs. 910 had been received for the proposed Memorial Bust of Dr. Oldham, a further sum of about Rs. 600 was still required, and it was hoped that subscriptions to this amount would be received.

The **PRESIDENT** laid before the meeting a copy of the revised Rules and stated that a few alterations had been made in the wording of some

of the rules as passed at the last meeting, in accordance with the suggestions made by members when the proposed changes in the rules were circulated; but as these alterations in no way affected the spirit or substance of any of the rules, the Council thought it was unnecessary to again circulate them for the approval of the Society, and they would therefore be printed off and issued immediately.

The PRESIDENT also announced that as the first Wednesday in January would fall on the 8rd during the holidays, when probably many members would be out of Calcutta, it was proposed that the meeting of the Society should be postponed till the 10th instant.

COL. THULLIER suggested that the 17th would be a better day, and it was therefore agreed that the meeting should be postponed till that date.

The PRESIDENT announced that the Council recommend the election of Dr. J. Muir, as an Honorary Member of the Society in the room of the late Prof. C. Lassen.

The following were the grounds upon which this recommendation was made :

Mr. John Muir, D. C. L., LL. D., Ph. D. was elected a member of this Society in July 1837, and up to 1854, when he retired from the country, took a deep interest in the labours of the Society. He was an occasional contributor to the Journal of the Society, and attracted considerable attention by his contributions on Sanskrit Literature and Philosophy to the pages of the *Benares Magazine*. His life of Jesus Christ, in Sanskrit verse, established his reputation as a profound Sanskrit scholar. Since his retirement from India, he has been most assiduously engaged in oriental researches, and his essays in the Journal of the Royal Asiatic Society of Great Britain attest the success with which he has prosecuted them. His great work, however, is his "Sanskrit Texts," in the five volumes of which he has brought together the matured fruits of a long life of patient reading and research, and an amount of learning and critical acumen which place him in the foremost rank among the oriental scholars of the day. His generous gift towards the founding of a Sanskrit chair in the University of Edinburgh and the prizes given by him for essays on Indian Philosophy, and a translation of the Vedānta Sūtras also deserve honourable mention.

Mr. H. F. BLANFORD exhibited two series of synoptical weather charts of India, illustrating the atmospheric conditions which preceded and led up to the remarkably heavy rainfall at Allahabad on the 30th and 31st July, 1875, and that at Delhi, Rohtak, Gurgaon, &c., on the 8th and 9th September in the same year.

The charts exhibited were the first of the kind which had ever been constructed for India, or indeed which it had ever been possible to construct. They showed the distribution of pressure, and the direction of the wind over the whole of India at 10 o'clock in the morning of each day; the pressure being shown by isobars, or lines of equal pressure at the sea level, for each twentieth of an inch of the barometer, and the winds by arrows, certain marks on which indicated the approximate mean velocity of the wind on the day in question. The first series of charts extended over twelve days, *viz.* from the 20th July to the 1st August; and the second over eight days, from the 2nd to the 9th September. The general character of the phenomena illustrated was similar in the two cases. A barometric depression was apparently generated in Orissa or possibly in the North-West corner of the Bay: (there was no direct evidence pointing to a marine origin, and although, in the absence of any observations at sea, it could not be positively affirmed that the formation took place over the land, such was at least the more probable view). Around this depression, the winds blew spirally inwards, forming what may be termed a land cyclone. The velocity was in no case very high, and the barometric gradients were in general moderate, but in other respects the conditions were similar to those of a cyclone. From Orissa, the depression moved westwards towards Nagpore, and then somewhat northward. That which was formed in Orissa on the 25th July, entered the Gangetic valley, and coalesced with the depression which had its seat in that region throughout the rainy season; and on the 30th and 31st the depression became very intense over Allahabad, and apparently lasted for at least a day after the heavy fall of rain, which was registered at 18 inches.

The depression in the early part of September moved rather to the North-West, and on the 8th and 9th was very intense on the plateau between the Narbadá and the Ganges, and in the upper part of the latter valley, especially over Sagar and in the neighbourhood of Delhi.

Mr. Blanford thought it probable that these land cyclones were not exceptional features of the meteorology of the rainy season, but were only somewhat exaggerated instances of the state of things that accompanies every general burst of rainfall at that season. If so their further study would certainly throw much light on the conditions that determine the distribution of the rainfall.

The HON'BLE E. C. BAYLEY exhibited the following silver coins:

No. 1. A coin of the city of Tarsus in Cilicia, struck under the Dynasty of the Seleucidan kings: according to the Duc de Luynes, a coin of the birthplace of St. Paul. In bad preservation, but rare.

Obverse. A seated figure of the god "Baal-Tars", with a defaced

monogram in front, and faint traces of Phœnician letters behind the head.

Reverse. Lion "passant" to the left, over it the Greek letter Γ.

Sassanian Coins.

No. 2. A coin of Khusrau Parwíz of Persia. Struck in his seventeenth year (?)

Mint very doubtful, coin imperfect.

No. 3. A do. struck at "Saham" in the thirty-sixth year (?) ; better preservation.

No. 4. According to Thomas, a coin of Varahran (Bahráman), the fourth king of Persia, but in bad preservation and of rude execution.

Parthian.

No. 6. Apparently a coin (according to Mianut) of Arsaces the seventh.

No. 7. As above—Arsaces the ninth.

Nos. 8 to 17. There are local Parthian or sub-Parthian types, examples of which are given in Wilson's 'Ariana Antiqua.' These legends are only in Arsacidan Pehlvi, but very little progress has been made in their decipherment and their precise attribution is yet undetermined. There will probably be some information regarding them in the new work on Parthian coins now about to issue in the revised Madden series. I should like to see them again when that appears, but have no leisure to work at them now.

There are two types, one with a head on either side, the reverse of the other bears a fine altar with a single 'mobid', or priest.

Also the following gold coins belonging to J. R. Reid, Esq., C. S., Jaunpur.

No. I. *Kanishka* or *Kanerke*.

Obv. King sacrificing, with right hand at an altar ; spear in left hand.

Legend—

PAONANOPAO

KANHPKJ KOPANO

Rev. Figure four-armed of Ugra = Siva, and fawn. *Legend*—OKPO = Ugra (OPKOΣ orcus).

No. II. *Obverse* as in No. 1. *Reverse*—female figure with a peculiar pronged instrument in right hand.

Legend NANA.

("Nana" or "Nanaca" is a Sythian goddess and a very old deity. Nana = Anaitis = Anáhíd = Diana (Cunningham).)

No. III. *Obverse* as in No. 1. *Reverse*—Figure as in No. II, but with sword in girdle and a half moon on the head.

Legend NANAPAO.

(*Kao*, honorific title.) A fine coin.

No. IV. *Obverse* as in No. I, king (?) helmeted, with nimbus and spear in right hand. Sword in girdle.

Legend OPAATNO "Orlagno"; meaning not yet known.

The SECRETARY exhibited some specimens of Meteorites recently fallen in India and read some remarks upon them by Mr. H. B. MEDLICOTT.

Record of the Judesegeeri Meteorite of 16th February, 1876.

The meteorite was sent to the Indian Museum by the Chief Commissioner of Mysore. It fell in the bed of the tank of Judesegeeri village in the Chittanhalli hobli of the Kadaba Taluk, on the evening of the 16th February, 1876. The position is about Lat. $12^{\circ} 51' N.$, Lon. $76^{\circ} 48' E.$

The pieces sent weigh in the aggregate 1 lb. 9 oz. 136 grains. They are all more or less broken, forming probably a small portion of the total fall. There is nothing remarkable in their appearance: they contain nodules of triolite; but for the rest they have the pale grey colour and granular texture of the most common variety of meteoric stone. The specific gravity is 8.68.

The circumstances of the fall are related as follows:—

Judesegeeri stone—Report of the Deputy Commissioner of Tûmkûr.

"The find is entirely due to Mr. Assistant Commissioner Woodcock, who, having received reports from all his Police stations in the Kadaba Taluk of the meteor being seen, and the general impression that it had fallen close to each, instituted a vigorous search, and it then transpired, that a Tigalar, who was that night sleeping in a hut in his garden, heard, after seeing the meteor, a thud in the earth, not far distant, as of a heavy body falling. In the morning he discovered the stone buried several inches deep in the bed of the adjoining tank; but under the impression that it contained gold it had unfortunately been smashed and changed hands before the fragments now sent were eventually recovered. It is "alleged to have smelt strongly of sulphur when found."

"I observe from the local papers that the meteor was seen at Bangalore, and supposed to fall in the Roman Catholic Cathedral compound. I myself saw it at this station (Tûmkûr), it was observed at Kallambelle and Sira; at the former place it is reported to have been accompanied by a slight shock of an earthquake, and a great noise, which latter was also distinctly heard at Tûmkûr almost immediately following the fall of the meteor, and apparently being a direction from north to south; and I have also learned from Major Armstrong that the meteor was observed by him at Chitaldroog nearly at the same time as visible in this District and at Bangalore; the whizzing sound of the falling meteor was, however, apparently only heard in the western Taluks of this District."

Record of the Nageriá Meteorite, of 22nd April, 1876.

Nageriá is in the Fathábád parganah of the Agrah district, Lat. $27^{\circ} 8' N.$, Lon. $78^{\circ} 21' E.$ The fall occurred about an hour and a half after sunrise on the 22nd Oct. 1876. The specimen was sent by the Archaeological Society of Agrah to the Asiatic Society of Bengal and forwarded to the Indian Museum. An account of the circumstances of the fall, drawn up by the Tahsildár, was also received. This is appended as a sample of a respectable native official's thoughts on the subject.

Considering that a mass estimated as weighing 26 lbs., is stated to have fallen, it is very unsatisfactory that so small a portion should have been secured for museums where these objects can be appreciated.

The total quantity received weighs only about 300 grains. It is a very friable stone; of an unusual whiteness, greenish gray granules in an abundant, white, almost powdery matrix. The film of fusion is thicker than is generally the case, it has a brilliant black surface. The sp. gr. is 3.12.

Nageriá stone—Tahsildár's Report.

"About an hour and a half after daybreak there was a great whizzing noise, as if a great bird rose: then a ball fell and immediately broke; the sound of its fall reached a great distance. From the inspection of the place it appeared that this ball fell in the middle of field No. 253. A large hole 2 feet in circumference and diameter 8 inches and depth $8\frac{1}{2}$ inches, was made. The land on the spot is very hard. From the inspection of the spot it further appears, that when it fell, it was broken into many fragments, which flew to a great distance. Arguing from the weight of the fragments and the depth and circumference and diameter of the hole it seems, that the ball must have weighed nearly 13 seers; and considering the hardness of the ground it would appear that it fell straight on the ground from a great distance, and with great force. From the shape of the hole, it seems, that the ball fell perpendicularly from above. And as the ball was of very hard substance, and crumbled away, it must have fallen from a very great distance."

"Sometimes a substance in the bright phosphorus, which we in India call broken stars, takes fire and falls. But as this ball fell in the day, it cannot be discovered whether it was bright or not. Sometimes European people seat themselves in balloons and ascend, and put stones, &c., in the balloon; and when the balloon grows heavy, throw out the stones, &c., to lighten it, and it then ascends further. It is just imaginable that some aeronaut may have flung out the stone. But I never saw a stone like this. In short, there are many doubts in the matter, but there is no doubt on this point that the ball fell from above on to the ground, and that the peo-

ple who remained on earth had nothing to do with it. The fragments of the ball are white and dark inside, like the dregs after sifting lime and plaster, and outside it is black, like a lacquer; and it is not clear what it is. There are no trees, &c. where the ball fell."

The following papers were read:

1. *Fifth list of Birds from the Hill Ranges of the N. E. Frontier of India.* By Major H. H. GODWIN-AUSTEN, F. R. G. S., F. G. S., &c.

The present list, which adds 36 species, bringing up the record of birds from the Eastern districts and hill-frontier to a total of 525 species, includes birds, principally from the Manipur Hills, obtained by Messrs. Ogle and Robert in the field-season of 1873-74, in the Eastern Naga Hills, by Mr. A. W. Chennell, and in the Khasi Hills, by the author himself in 1875. All the new forms except two, which are here for the first time made known, were described in a joint paper by Viscount Walden (now Marquess of Tweeddale) and the author, in 'the Ibis' for 1875; these descriptions are repeated in full.

The paper concludes with some short additional notes on the birds of the lists previously communicated by the author to the Society's Journal.

The paper will appear in Journal Part II, No. 4, for the current year, and will be illustrated by three coloured plates, two of which are by the author's own hand.

2. *Contributions towards the knowledge of the Indian Fossil Flora. On some Fossil Plants from the Damuda Series in the Raniganj Coal-field, collected by Mr. J. Wood-Mason.* By Dr. O. FEISMANTEL.

Mr. Wood-Mason has lately brought a very fine collection of fossil plants from the Raniganj coal-field, and at his request I have undertaken the examination and description of these interesting remains.

Although the Geological Museum possesses large collections from the same coal-field, as well as from all other localities, Mr. Wood-Mason's collection is yet very valuable, containing as it does not only several perfectly new, but also better specimens of the known forms.

The Raniganj coal measures belong to the great series of rocks which are classed as the Damuda Series, and they are the top group of this series. These Damudas, together with the Panchet group, form the lower portion of the whole plant-bearing system, for which it is now better to adopt the name Gondwana System, as there occur in it not only plants, but animals also.

Mr. Wood-Mason's collection is especially of value for estimating the age of this series, which from a stratigraphical point of view may well be divided into three or four groups, but which from a palaeontological point of

view constitutes a single formation, to which besides the whole Panchet group is in the closest relation.

In some preliminary notes on the Indian fossil flora published in a recent number of the Records of the Geological Survey of India,* I have attempted to show that all the plant-bearing beds from the Kach-Jabalpur group down to the Talchir group are the representatives of the European Jura-Triassic systems, merely on palæontological grounds, such as the best known palæontologists, from Brongniart, Sternberg, Lindley, and Hutton, down to those of the present day, have established them; and these observations on the Indian flora are already partly approved at home.

From the occurrence of the genus *Glossopteris* (which is so very frequent here in India in the Damudas and in the upper portion of the Australian coal-measures, but which occurs also rarely in the lower coal-measures of the same country), our Damudas were for some time compared with these Australian lower coal-measures, which contain scarcely anything but the remains of animals of lower carboniferous age; and the two were therefore considered to be of the same age. But while our Damuda Series contains in no part the least trace of a marine animal, or even of a Fauna, which permits of any comparison with the Australian coal-strata, it contains on the other hand a very numerous Flora which has all its connections in Europe, and this in the mezozoic strata in general and in the Trias in particular.

The same age must be assigned also to the upper Australian coal-measures (Wianamatta, Hawkesberry, Victoria, Queensland, Tasmania, &c., Upper Newcastle Coal-beds), and with these only can our Damuda flora be compared. *Glossopteris* makes its appearance as a genus rarely in Australia at a time when carboniferous animals lived in the sea, but it survived and became more abundant after these carboniferous strata had been deposited, i. e., when the carboniferous animals were extinct, i. e., when another period of life had begun.

I have shown these relations in the last number of the Records (IX. 4).

Mr. Wood-Mason's fossils exhibit again throughout the most unmistakable characteristics of a mesozoic flora.

a. Ferns with net-venation, of which *Sagenopteris* and *Glossopteris* are examples.

b. Ferns with parallel venation, passing out from the midrib at right or slightly acute angles, and forked—*Tueniopteris* (and I am sure the present paper will not fail to make the mesozoic and triassic age of the Damudas still more evident, as in the whole flora there is not a single form which could justify a view of an age lower than Triassic; this of course can be only stated as regards the homotaxis.) I cannot here discuss all the previous literature of the subject. This will be done in detail in my

* Vol. IX, 2, 3.

paper in the Journal, and it may be sufficient to point out here only the most important facts.

I have determined altogether 14 species of fossil plants in Mr. Wood-Mason's collection; amongst these are 7 new species and amongst these again 2 new genera.

Represented are the orders of *Equisetaceæ* and *Filices*.

Amongst the *Equisetaceæ*, which on the whole are very frequent in the Damuda Series, were especially represented: *Sphenophyllum Trizygia*, Ung. This was formerly named *Trizygma speciosa* by Royle, later mentioned as *Sphenophyllum speciosum* by McClelland, and finally established as *Sphenoph. Trizygia* by Unger. It is distinctly characterized by the number and position of the leaflets in the articulations. There are invariably 6 leaflets only, which, considered according to their size, form three pairs, (therefore *Trizygia*) and are placed on one side of the articulation. Figures of this interesting fossil have been published altogether twice only by Royle and McClelland, but as the work of this latter author is very little known, I give two more figures with my paper. The same species occurs also in the Barakur group.

The second fossil I describe from the *Equisetaceæ* is the famous *Vertebraria*, which to date is not yet quite satisfactorily explained. The first reasonable explanation was given by Sir Ch. Bunbury, who considered it to be the rhizome or roots of an equisetaceous plant, as he supposed of *Phyllothea*, which means, in another sense, of *Schizoneura*, most of the so-called *Phyllothea* being states of this genus. Since that time nothing positive has been pronounced about this fossil. Mr. Wood-Mason's collection contains several nice specimens, amongst which one which shows quite certainly the equisetaceous nature of this fossil, exhibiting perfectly distinctly 2 or 3 articulations with ribs not alternating in the articulation, but quite opposite, as is generally the case in the Triassic *Equisetaceæ* of Europe. The Australian *Vertebraria* is, as far as it is described, different from ours.

Besides these equisetaceous plants the most frequent in the Damudas is a representative of the well-known Triassic genus *Schizoneura* which I have called *S. Gondwanensis*, and which is very near to *Schizoneura paradoxa*, Sch., of Europe. A good many of the stalks generally called *Phyllothea* belong to this genus, although a true *Phyllothea*, in Zigno's sense, occurred too. *Phyllothea* is a mesozoic genus. In Australia it is frequent in the Upper Newcastle Beds, and I have lately discovered a form almost identical with *Phylloth. equistiformis*, Zign.

But amongst the Ferns are the most interesting forms.

Of the *Sphenopterides* I have described a *Sphenopteris polymorpha*, so-called from the variations of form which it exhibits according to the size or

age of the specimens. I think Mr. McClelland's *Pecopt. affinis* is to be placed here. The same form occurs also in the Barakur group near Cuttack.

Of the *Pecopterides* there occurred two pinnae representing two species, which, however, belong to the same group of mesozoic ferns, viz. to the group of the *Alethopteris Whitbyensis*, Gopp, which Schimper first indicated, but for which Saporta more recently advocates the genus *Cladophlebis*, Bgt. These two species are :—

Alethopteris Lindleyana, found in fructification, is closely analogous to the *Alethopt. indica* from Rajmahal and to the true *Alethopt. Whitbyensis* known as yet only from L. Oolite and Lias. This species we have also in the Kach and Jabalpur groups.

Besides these two species, there occurred a perfectly new type of *Pecopterids* which is very closely connected with the living *Phlegopteris*; in the fossil flora it belongs to the genus *Alethopteris*, so that I describe this very fine form as *Alethopt. phlegopteridoides*.

The *Tueniopterides* are of especial interest, as being represented by just such forms as exhibit very well the mesozoic character of the flora, and as establishing the connection between the Lower and Upper Gondwanas.

The *Tueniopteris danacoides*, of which McClelland figured two specimens, is the same as that which Royle called *Glossopt. danacoides*, but which has not been mentioned since the publication of McClelland's paper, although it has occurred. Mr. Wood-Mason collected many specimens of this species, and assures me that it is very frequent at Raniganj. According to the new classification of the *Tueniopterides*, these forms from Raniganj belong to Schimper's subgenus *Microtaeniopteris*. Another big *Taeniopteris* was also met with, but the specimens of it are in so fragmentary a condition that I cannot describe it.

Amongst the *Tueniopterides*, I place the new genus *Palaeovittaria*: a splendid specimen contains about ten leaves of a fern, the shape of which resembles that of *Sagenopteris*; the midrib vanishes towards the apex; and the veins are not arcolated, but pass out at a very acute angle from the midrib towards the margin and are forked. In these respects the fossil fern agrees, according to Mr. Kurz, only with the living *Vittaria*, so that I establish it as new genus *Palaeovittaria* calling the species *Palaeov. Kurzi*. Nowhere in the whole coal-measures has anything like it yet been met with.

The order *Dictyopterides*, including all ferns with net-venation, is also richly represented. The most interesting is a new genus which I call *Belemnopteris*: the shape of the leaf is arrow-like, there are three chief veins, and the other veins form arcoles. This fossil fern has a very close resemblance to *Pteris sagittaeifolia* and to *Hemionitis cordata*, Roxb., but

to which of them it should more correctly be brought nearest, cannot be well decided, as our fern exhibits no fructification. *Hemionitis* has a fructification along the secondary veins, while *Pta. sagittarfolia* has of course a marginal fructification. It is a very remarkable fossil, and I call the species after Mr. Wood-Mason.

Another very marked fossil is a species of the genus *Gangamopteris*, a form intermediate between *Glossopteris* and *Cyclopteris*, that is to say, it has no midrib; and the veins radiate towards the margins, and are not forked, as in *Cyclopteris*, but form areoles. Formerly, some forms of this genus with narrow net-venation were described as *Cyclopteris*, but only lately have their true relations been determined and explained by Mr. McCoy in his *Prodrome*. From the Damudas I have already described 2 species; this from the Raniganj field is a third, and I name it *Gangamopt. Whittiana*, after Mr. Whitty of Kurhurbali. It has very wide hexagonal and polygonal areoles. Amongst living forms, *Antrophyum* comes nearest to it, and of this the varieties without midrib. *Gangamopteris* is a mesozoic genus.

Of the genus *Glossopteris*, I have first to mention *Glossopteris angustifolia*, a species which was first described by Brongniart but has since not been recognized; Mr. Wood-Mason has brought several specimens of it which are more complete than those Brongniart had: they show the apex, show well that the venation was incorrectly drawn by Brongniart, and show besides this a margined margin, which perhaps indicates the fructification—which would therefore be fructification *Pteridis*. This is the most important point in this *Glossopteris*, and we have thus three different fructifying states of *Glossopteris*: Kanthi, Australia, Raniganj.

Besides this *Gl. angustifolia*, there occurs very commonly at Raniganj a form which is equally frequent throughout the whole Damudas. I name it *Glossopt. communis*. It is of various dimensions, sometimes very large, with the midrib distinct, and the secondary venation very narrowly arcuated. The thorough examination of the *Glossopterides* should yield altogether a great many species.

That this genus occurs in Australia in the lower portion of the coal-strata also, does not affect the question of the age of our Damudas; if such considerations were allowed weight, we would be obliged, for instance, to consider the Salt Range Trias as carboniferous, merely on account of the presence of the genus *Bellerophon*, or *vice versa*.

I have now only to mention a *Sagenopteris* from the Raniganj field, which is described as *Sagenopt. polyphylla*: it is again a fern with net-venation, and it belongs to a genus which in Europe is mesozoic and Rhetic.

Besides these plants brought by Mr. Wood-Mason there are not many more species known from this coal-field altogether.

The following conclusions can be drawn :—

1. Mr. Wood-Mason's collection proves again that the Raniganj group contains a Flora only.

2. A comparison of this Series can be made only with corresponding Series and not with strata in which marine animals are predominant.

3. All the plants brought by Mr. Wood-Mason show excellently the mesozoic *habitus* of the fossil flora as the illustrious Brongniart has established it in his excellent paper, and especially in his '*Tableau des genres des végétaux foss.*'

The paper, which is illustrated by eight plates, will be published in the Journal Part II, No. 4, for the current year.

3. *On the Helicidæ collected during the Expedition into the Dafla Hills, Assam. By Major H. H. GODWIN-AUSTEN.*

The present list contains nearly all the species of *Helicidæ* that were obtained by the author during the expedition of 1874-75, a few species only still remaining undetermined; these will be worked out, and the novelties amongst them described by Mr. G. Nevill from the series presented by the author to the Indian Museum.

The paper, which will appear in the forthcoming number of the Journal, Part II, is illustrated by a coloured plate of the animals and their shells from the author's own pencil.

4. *On the Development of the Antennæ in the Pectinicorn Mantidæ. By J. WOOD-MASON, Esq.*

(Abstract.)

The author shows that, down to the last change of skin but one, no difference is to be detected between the two sexes of *Gongylus gongylodes* either in the form or in the proportionate length of the antennæ, which in both male and female are identically the same simple and setaceous structures, consisting of two distinct basilar segments followed by a multitude of very short and ill-defined flagellar ones; but that shortly after this event these appendages in the male commence to thicken throughout that portion of their length which in the perfect insect is bipectinated, so as eventually to acquire a compressed spindle-shaped form; that this thickening is the outward manifestation of the growth going on beneath the outermost layer of chitinous membrane (*last skin*), which, at an early date, *pari passu* with the formation of the new antenna, tends to separate off from the rest, and thereafter serves as a capsule or sheath wherein the two series of pectinations are developed by a process of budding from the antennal segments between the basal 5 and the apical 12-15; that as the pectinations grow they press upon so as to distend the walls of the sheath,

completely obliterating all traces of its previous segmentation; and that if the sheath be carefully dissected away when distention of its walls has proceeded almost to the bursting point (*last moult*), the completely bipectinated antenna of the adult male is disclosed, but with the teeth of each comb all glued and compressed together and with the two striated plates thus formed apposed to one another at their free ends, so as to enclose a compressed spindle-shaped cavity.

The reading of the following papers was postponed—

1. On an Imperial Assemblage at Delhi 8000 years ago. By Dr. Rájendralála Mitra.
2. On Himalayan Glaciation. *By J. F. Campbell, Esq.

LIBRARY.

The following additions have been made to the Library since the Meeting held in November last.

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,

presented by the respective Societies or Editors.

Agra. The Archaeological Society of Agra.—Proceedings, January to June, 1876.

Berlin. Königlich Preussische Akademie der Wissenschaften,—Monatsbericht. Juni, 1876.

Peters.—Über die von S. M. S. Gazette gesammelten Säugethiere aus den Abtheilungen der Naget, Huftiere, Sirenen, Cetaceen, und Buntelthiere.

Birmingham. Institution of Mechanical Engineers.—Proceedings, Nos. 2 and 3, 1876.

No. 2. *W. Anderson.*—Description of the Ogi Paper Mill, Japan.

Bombay. The Indian Antiquary,—Vol. V, Pts. 59 and 60, October and November, 1876.

Pt. 59. *Prof. C. H. Tawney.*—Metrical Translations of the Vairágya Satakam. *Kāshināth Trimbak Telang.*—The Sankaravijaya of Anandagiri. *Rev. J. F. Kearns.*—Silpa Śāstra. *Rev. G. U. Pope.*—Notes on the South-Indian or Dravidian Family of Languages. *C. Horne.*—Notes on a Tibet Teapot and on the Tea used therein. *Rev. J. Cain.*—The Bhadrāchallam and Rékapalli Talukas, Godāvari District, South India.

Pt. 60. *Prof. C. H. Tawney.*—Metrical Translation of Bhartrihari's Vairágya Satakam. *W. F. Sinclair.*—Notes on some Caves in the Karjah Taluka of the Thané Collectorate. *Dr. J. Muir.*—Krishna's opinion of unfair fighting. *Maxims and Sentiments from the Mubābhārata.*

Buenos Ayres. La Academia Nacional de Ciencias exactas existente en la Universidad de Cordova,—Acta, Tome 1, 1875.

Calcutta. Geological Survey of India,—Records, Vol. 9, Pts. 2 and 3.

Pt. 2. Dr. O. ~~Friemantel~~.—Notes on the age of some Fossil Floras in India. R. Lydekker.—Description of a Cranium of *Stigodon Ganesa*, with notes of the sub-genus and allied forms. H. R. Medlicott.—Note upon the Sub-Himalayan Series in the Jamu (Jamoo) Hills.

Pt. 3. Dr. O. ~~Friemantel~~.—Notes on the age of some Fossil Floras in India. W. T. Blanford.—Note on the Geological age of certain groups comprised in the Goudwānu Series of India, and of the evidence they afford of distinct Zoological and Botanical Terrestrial Regions in Ancient Epochs. Th. W. H. Hughes.—On the relations of the Fossiliferous Strata at Maléri and Kotá near Sironcha, Central Provinces. R. Lydekker.—Notes on the Fossil Mammalian Fauna of India and Burma.

Leipzig. Die Deutsche Morgenländische Gesellschaft,—Zeitschrift, Band 27, Heft. 1, II, IV; Band. 29, Heft. 1; Band 30, Heft 1 und II.

Band 27, Heft 1 und II. Th. Aufrecht.—Ueber die Paddhati von Çarágadhara. K. Himly.—Streifzüge in das Gebiet der Geschichte des Schachspieles. Ed. Sachau.—Zur Erklärung von Vendidad I.

Heft IV. C. Sandrecki.—Ein Beitrag zur Kenntniss der Arabischen Sprache in ihrer gegenwärtigen Fortbildung. A. Hochtlung.—Einige Bemerkungen zu den von Th. Aufrecht veröffentlichten Sprüchen aus Çarágadhara's Paddhati. F. Spiegel.—Zur Erklärung des Avesta. H. Schanz.—Indischer Regentenspiegel.

Band 29, Heft I. A. Bastian.—Die Verkettungstheorie der Buddhisten. Th. Noldke.—Zur Geschichte der Amber im 1. Jahrh. d. II. aus syrischen Quellen. M. l'Abbé Martin.—Discours de Jacques de Saroug sur la chute des idols.

Band 30, Heft I. Jul. Oppert.—Ueber die Sprache der alten Meder. A. F. Pott.—Chemie oder Chymie. A. von Krumm.—Philosophische Gedichte des Abûl-l-'Alâ' Mu'arrî. H. Hubschmann.—Ueber Aussprache und Umschreibung des Altarmenischen. T. Garathausen.—Ueber der griechischen Ursprung der Armenischen Schrift. W. Bacher.—Su'ûdi-Studien. H. Hubschmann.—Iranisch-Armenische Namen auf karta, kert, gird.

Heft II. H. Jacobi.—Beiträge zur indischen Chronologie.

London. The Athenaeum.—Nos. 2545 to 2548 and Nos. 2552 to 2558, 1876.

——. The Geographical Magazine,—Vol. III, Nos. 9 and 10. September and October, 1876.

No. 9. An Itinerary from Aksu to Yarkand and Ladak. The Statistical Survey of India. Fosnooski's expedition through China and Mongolia.

No. 10. David Ker.—A Peep into Kokan; or from Djizak to Tashkent, via Khodjent.

——. Geological Society,—Qt. Journal, Vol. 32, No. 127, August 1875.

Prof. W. Boyd Dawkins.—On the Mammalia and Traces of Man found in the Robin-Hood Cave. Mr. G. T. Bettany.—On the genus *Mory cocharius*, with

Descriptions of two new Species. *Prof. Seeley*.—On the Posterior Portion of a Lower Jaw of *Labyrinthodon* (*L. Savini*) from the Trias of Sidmouth. *Mr. E. T. Newton*.—On two Chimæroid Jaws from the lower fine sand of New Zealand. *Prof. Owen*.—On Evidences of Theriodonts in Permian Deposits elsewhere than in S. Africa. *Mr. Hulke*.—On a modified Form of Dinosaurian *Ilium*.

London. The Linnean Society,—Journal, Zoology, Vol. 12, Nos. 60—62, and 63.

Nos. 60—62. *Prof. Allman*.—Diagnosis of new Genera and Species of *Hydroids*.

T. S. Cobbold.—On the supposed Rarity, Nomenclature, Structure, Affinities and Source of the large human Fluke (*Distoma crassum*, Busk.) *H. G. Seeley*.—Similitudes of the Bones in the *Euchonauria*. *F. H. Welch*.—The Anatomy of two Parasitic Forms of the Family *Tetrarhynchida*. *A. G. Butler*.—Notes on the *Lepidoptera* of the Family *Zygonida* with descriptions of new Genera and Species.

No. 63. *J. Anderson*.—On the Cloacal Bladders and on the Peritoneal Canals in *Chelonia*. *Sir John Lubbock*.—Observations on Ants, Bees, and Wasps.

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I N D E X

TO

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FOR 1876.

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CIRCULAR.

The Council of the Asiatic Society desire to lay before the Society a brief statement of facts with reference to the recent election of Honorary Members of the Society.

At the August meeting of the Society, three distinguished cultivators of science were recommended by the Council, in accordance with the rules of the Society, for election as Honorary Members. In two of these three cases no opposition was raised: in the third, the nomination of the Council was opposed, and under the rule of the Society, which requires that an Honorary Member should obtain three-fourths of the total number of votes given, the gentleman nominated by the Council was rejected when balloted for at the November meeting.

The Council scarcely think it needful to state to the Society again the high scientific qualifications and successful career of Dr. Werner Siemens the gentleman so rejected. These are too well known to require to be detailed here. But in the prosecution of the opposition to his election, a paper purporting to be a form of 'protest' to be used in the event of his success, which was printed and must therefore have been deliberately prepared, was freely distributed to members attending the meeting, and was made the ground-work of a personal canvas among those members for votes against Dr. Siemens. This paper contains a statement of the reasons assigned by those who agreed to it, for the rejection of the Council's nomination. And as this paper thus gives a summary of the principal reasons which were held to be sufficient by the writer of that paper to cause the rejection of the candidate selected by the Council, the latter body think it will be sufficient to refer briefly to these reasons.

There were four reasons given:

1st. *"That when the Physical Science Committee were asked by the Council to recommend a nominee for the Honorary Membership of the Society, and Dr. Werner Siemens' name was proposed to them by the President, that body, i. e., the Physical Science Committee, rejected the nomination by a large majority."*

The Council felt perfectly competent to select a candidate, and they alone could do so. But they sought the aid of the Physical Science Committee, towards suggesting fitting claimants. That Committee minuted on the reference to them; they never met, the question was never put to the vote, and they did not therefore reject any one's name, or nominate

any one. The President did not propose any single person, but named two, either of whom he considered a fitting representative of the Physical Sciences. In fact, five names came before the Council from the Physical Science Committee. And, on analysing the proposals for each nominee, it appeared that (taking letters for the names), A had 5 direct supporters: B had 4, C had 3, D and E were only put forward as alternative names with others. Including the cases of doubtful or double names, A's name was given with others by three in addition to the 5 above stated, B's was given by two, and C, by two. Under these circumstances the Council are very unwillingly compelled to remark that it is a serious misrepresentation of the facts to assert that B, the gentleman finally selected by the Council, was rejected by the Physical Science Committee by a large majority.

All the names suggested by the Physical Science Committee, and others suggested by other members of Council came before the Council at a large meeting, and after elimination of others, the two named above A and B came up for final voting; the votes of the Council were taken individually and successively, and the result was a distinct majority in favor of B who was therefore recommended to the Society for election, as an Honorary Member. Nothing could have been more deliberately or fully discussed.

2nd. The second reason given for objecting to the gentleman proposed as an Honorary Member is "*that the Council in nominating Dr. Werner Siemens, were imperfectly informed and some of them entertained a mistaken impression as to the identity of their nominee.*" The Council are now aware that in probably two cases the members voting for Dr. Werner Siemens were not at the time aware that there were two brothers of that name. In truth they have invariably worked so entirely together in all their scientific discoveries, that the fact of there being two brothers was, the Council finds, unknown to many in the Society to whom at the same time the name and qualifications of "*Siemens*" were well known. The misconception was, however, subsequently corrected, and the members of Council who had been under the mistaken impression, did not find it at all necessary to suggest any change.

3rd. The third reason given, is that "*the imperfection of the knowledge of Dr. Werner Siemens' qualifications possessed by the Council has been publicly illustrated by their official announcement published in the Proceedings of the Society for August last, in which an important discovery is claimed for Dr. Werner Siemens, which was made by Professor Jacobi of St. Petersburg.*"

This being the only reason given in this protest which has even the remotest reference to the qualifications of the candidate, the Council feel bound to notice it more in detail.

In the first place they submit that, even were the imputation of imperfect knowledge on the part of the Council entirely supported, they fail to see in what way that justified the rejection of a candidate whose scientific position was thoroughly established. Nor can they admit the justice of visiting their failures, supposing them to exist, upon the unoffending head of others.

But the Council cannot admit the charge. In the official announcement referred to, the Council claimed for Dr. Werner Siemens no "important discovery;" their words were "he first introduced the covering of telegraph wire with Gutta Percha and India Rubber." And by doing so he rendered Submarine telegraphy practicable. Neither the Council of the Society, and much less Dr. Werner Siemens, ever questioned that Jacobi and others had previously to Siemens tried experiments with many different kinds of insulating materials including caoutchouc. This is more freely stated by Dr. Werner Siemens himself and by his brother William Siemens than by others, so that the insinuation that either of them was disposed to take credit for a discovery made by others is unsupported. Dr. C. William Siemens in his account of the Malta and Alexandria Cable, read to the Institution of Civil Engineers, London, fully states Jacobi's early trials. Dr. Werner Siemens, in his paper read to the Royal Society, Berlin, equally notices the early attempts of many persons to find insulating media and refers to the use of glass tubes, metal tubes, &c., and of caoutchouc, specially naming Jacobi. But he very significantly adds, that *all such had failed*. This was up to 1842. In 1843 the qualities of Gutta Percha first became known. Montgomerie brought a considerable quantity from the Straits, and this was experimented on in various ways, by Dr. Werner Siemens and in 1846 having satisfied himself of its qualities (pliability and insulation) he recommended to the Prussian Government the use of the new material for the construction of subterranean cables or wires. Submarine telegraphs were then unknown. Further than this he also invented a machine for covering the wire with the gutta percha, and the subterranean wire from Berlin to Cologne (laid down in 1848) was made in this manner. Further; Dr. Werner Siemens' machines, with such modifications as the increase of knowledge introduced, have been, and still are in use for covering telegraph wire with gutta percha and with indian rubber. In fact all the present cables laid, whether consisting of gutta percha or indian rubber, have been manufactured by Dr. Werner Siemens' machines.

Those who desire to investigate this question will find the materials in the *Monats-berichte der Berliner Akad*, 1874; in *Poggendorff's Annalen* LVIII, 1842, p. 109 and CLV, 1875, p. 272; *Bullet. der Phys. Math. Klasse der Akad. St. Petersburg*, I. 80; *C. W. Siemens on the Malta and Alexandria Cable, Journ. Inst. Civ. Engrs. London*, (and separately printed);

or in any of the general treatises on electricity or telegraphs, such as *Kuhn's Handbuch der Angewandten Electricitat*, II. 76.

The Council regret to say that they have been informed by members of the Society that they were misled by such hasty and unsupported questionings of the Council's accuracy in the matter.

The fourth reason given is that "*when Dr. Werner Siemens was nominated at the August meeting of the Society, and it was endeavoured to bring these facts to the knowledge of the Society's meeting, the President availed himself of the powers vested in him under Rule 29, Section f., to suppress all discussions of that gentleman's qualifications, and refused to allow the votes of the meeting to be taken under the provisions of Rule 28, Section c., as was proposed by a member present.*"

The Council are unable to see in what way the action of the President, whatever it was, could affect the qualifications of the gentleman proposed by the Council as an Honorary member. The President most properly put a stop to a discussion on subjects irrelevant to the business of the meeting, of which no notice had been given, and which it was simply impossible could lead to any definite result. The question raised, namely, the nomination of an Honorary member was one with which neither the individual member nor even the meeting at large could interfere; it rested with the Council of the Society alone. And it seemed in every way desirable to avoid the introduction of any disputes as to personal claims or personal disqualifications, which are invariably avoided in every Society. There was, however, a simple course open to the member raising the objections to state those objections to the Council. And in this particular case, owing to the recess in Autumn, there were no less than three months during which this could have been done, but was not done.

The Council do not for a moment dispute the right of any member or members to dissent from any recommendation which they may make, but when statements which they know to be misleading, and which are couched in terms reflecting both on their courtesy and knowledge, have been circulated to the members of the Society, and made the basis of an organised opposition, they feel that they owe it to the Society at large to explain fully the errors of these statements and to justify their own conduct.

The Council do not propose a fresh nomination of fitting claimants for Honorary membership. But with reference to this they feel themselves entirely unfettered by recent occurrences, and they appeal to the sense of justice of the Society to prevent the discussion of questions of scientific qualifications on grounds of objection to the personal acts of any of the officers of the Society, which are totally irrelevant to the matter under consideration.

[APPENDIX.]

LIST OF MEMBERS
OF THE
ASIATIC SOCIETY OF BENGAL,
ON THE 31ST DECEMBER, 1875.

LIST OF ORDINARY MEMBERS.

The * distinguishes Non-Subscribing, the † Non-Resident Members,
and the ‡ Life-Members.

N. B.—Gentlemen who may have changed their residence, since this list was drawn up, are requested to give intimation of such a change to the *Secretaries*, in order that the necessary alterations may be made in the subsequent edition. Errors or omissions in the following list should also be communicated to the *Secretaries*.

Gentlemen who are proceeding to Europe, with the intention of not returning to India are particularly requested to notify to the *Secretaries*, whether it be their desire to continue as members of the Society, otherwise, in accordance with Rule 14 B. of the Bye-laws, their names will be removed from the list at the expiration of three years from the time of their leaving India.

Date of Election.		
1860 Dec.	5.	Abdullatif Khán Bahádúr, Maulavi.
1868 Sept.	2.	†Adam, R. M., Esq.
1860 July	4.	†Ahmad Khan, Bahádúr, Sayyid, C. S. I.
1872 April	3.	†Ahsanullah, Khwájah.
1860 April	4.	†Aitchison, J. E. T., Esq., M. D.
1866 Jan.	17.	*Allan, Lieut.-Col. A. S.
1871 June	7.	†Alexander, J. W., Esq.
1860 Oct.	8.	Amir Ali Khán Bahádúr, Nawáb.
1874 June	3.	Amir Ali, Sayyid, Esq.
1865 Jan.	11.	*Anderson, Dr. J., F. L. S.
1872 June	5.	†Anderson, A., Esq.
1875 June	2.	Apcar, J. G., Esq.
1875 Feb.	3.	Armstrong, J., Surg., B. Army.
1871 Sept.	6.	†Atkinson, E. T., Esq., C. S.
1855 July	4.	*Atkinson, W. S., Esq., M. A., F. L. S.
1869 Feb.	3.	†Attar Singh Bahádúr, Sirdár.
1870 Feb.	2.	*Baden-Powell, H., Esq., C. S.
1873 Aug.	6.	†Badgley, Capt., W. F.
1859 Aug.	3.	Balaichánd Sinha, Bábu.
1865 Nov.	7.	†Ball, V., Esq., Geol. Survey.
1860 Nov.	1.	Banerjea, Rev. K. M.
1869 Dec.	1.	*Barker, R. A., Esq., M. D.
1873 March	5.	Barclay, G. W. W., Esq., M. A.
1860 July	4.	†Batten, G. H. M., Esq., C. S.
1859 May	4.	Bayley, E. C., The Hon'ble., B. C. S., C. S. I.
1873 Feb.	5.	Bayne, R. R., Esq., B. A.
1864 Sept.	7.	†Beames, J., Esq., B. C. S.
1841 April	7.	Beaufort, F. L., The Hon., B. C. S.
		Calcutta
		Agra
		Benares
		Dacca
		Mari, Panjáb
		Europe
		Darbhanga
		Calcutta
		Europe
		Fattehghur
		Calcutta
		Calcutta
		Allahabad
		Europe [ana
		Bhadour, Ludi-
		Europe
		Shillong
		Calcutta
		Geol. S. Office
		Calcutta
		Europe
		Calcutta
		Agra
		Calcutta
		Calcutta
		Cuttack
		Calcutta

Date of Election.			
1867 July	3.	Belletty, N. A., Esq.	Calcutta
1862 Oct.	8.	*Bernard, C. E., Esq., B. C. S.	Europe
1872 Aug.	7.	†Beverly, H., Esq., C. S.	Krishnagar
1864 Nov.	2.	Bhudeva Mukerjee, Bábu.	Chinsurah
1874 Nov.	4.	Bhagabati Charn Mallik, Bábu.	Calcutta
1875 July	7.	†Black, F. C., Esq.	Hamirpur
1873 Dec.	3.	Blackburn, J., Esq.	Calcutta
1857 Mar.	4.	Blanford, H. F., Esq., A. R. S. M., F. G. S.	Calcutta
1859 Aug.	3.	†Blanford, W. T., A. R. S. M., F. R. S., F. G. S.	Geol. S. Office
1873 Aug.	6.	†Bligh, W. G., Esq.	Muttra
1873 April	2.	†Blissett, T., Esq.	Dacca
1864 April	6.	Blochmann, H., Esq., M. A.	Calcutta
1871 April	5.	Bourne, Walter, Esq., C. E.	Calcutta
1868 Jan.	15.	†Boxwell, J., Esq., C. S.	Dumka
1872 June	5.	†Brooks, W. E., Esq., C. E.	Khagoul
1860 March	7.	†Brandis, Dr. D.	Simla
1871 Jan.	4.	*Brough, R. S., Esq.	Europe
1874 March	4.	†Brown, R. Esq., M. D.	Manipur
1866 Nov.	7.	*Browne, Col. Horace A	Europe
1874 April	1.	*Bruce, W. D. Esq., C. E.	Europe
1871 July	5.	Buckland, C. T. Esq., C. S.	Hooghly
1871 Sept.	6.	†Buckle, H., Esq.	N. Arracan
1872 Jan.	3.	*Butcher, W. D., Esq., M. R. C. S.	Europe
1873 Aug.	6.	†Butler, Capt. J., B. S. C.	Samaguting
1869 Jan.	20.	†Cadell, A., Esq., B. A., C. S.	Banda
1863 June	3.	*Campbell, The Hon'ble Sir G., K. C. S. I.	Europe
1873 Mar.	5.	Cappel, A., Esq.,	Calcutta
1875 May	6.	Carrington, R. C., Esq.,	Calcutta
1860 Jan.	3.	†Carnac, J. H. Rivett, Esq., B. C. S.	Ghazipur
1875 April	4.	Chambers, Dr. E. W.	Calcutta
1868 Aug.	5.	†Chandramohan Goswami, Pandit.	Gauhati
1872 Dec.	4.	†Chard, Rev. C. H.	Thayetmyo
1874 Aug.	5.	†Chennell, A. W., Esq.	Shillong
1875 June	2.	†Chennell, T., Esq.	Dibrugarh
1871 Sept.	6.	*Chisholm, R. F., Esq.	Europe
1868 Feb.	5.	†Clark, Lieut.-Col. E. G. Bengal Staff Corps.	Kheri, Oudh
1872 Aug.	7.	†Clutterbuck, Capt. F. St. Quintin.	Peshawar
1874 Nov.	4.	†Constable, A. Esq.	Lucknow
1871 Oct.	4.	*Cooke, H. G., Esq., C. S.	Europe
1868 Dec.	2.	†Cooke, J. E., Esq.	Madras
1872 June	5.	*Court, Major M. H.	Europe
1874 March	4.	†Crombie, A., Esq., M. D.	Rangoon
1873 Aug.	6.	Cunningham, D. D., Esq., M. B.	Calcutta
1874 July	1.	†Cowan, Capt. S. H.	Masuri
1847 June	2.	*Dalton, Col. E. T., C. S. I., Staff Corps.	Europe
1870 May	4.	†Damant, G. H., Esq., C. S.	Cachar
1873 Dec.	3.	†Dames, M. L., Esq., C. S.	Dera Ghazi Khan

Date of Election.		
1871 Jan.	4.	Daukes, F. C., Esq., C. S.
1861 Nov.	6.	†Davies, The Hon'ble R. H., C. S. I., B. C. S.
1869 April	7.	*Day, Dr. F., F. L. S., F. Z. S.
1856 June	4.	†DeBourbel, Major R., Royal Engrs.
1874 July	1.	Deane, Capt. T.
1870 Feb.	2.	†DeFabeck, F. W. A., Esq., I. M. Service.
1872 Aug.	7.	Dejoux, P., Esq.
1869 Oct.	6.	†Delmerick, J. G., Esq.
1878 Jan.	8.	†Dennys, H. L., Esq.
1864 July	6.	Devendra Mallik, Bábu.
1862 May	7.	†Dhanapati Singh Dughar, Rái Bahádur.
1853 Sept.	7.	Dickens, Col. C. H., C. S. I.
1870 May	4.	†Dobson, G. E., Esq., B. A., M. B., F. L. S.
1875 March	3.	Dodgson, Walter, Esq.
1859 Sept.	7.	*Douglas, Col. C.
1875 March	3.	Douglas, J., Esq., Govt. Telg. Dept.
1869 Feb.	3.	*Drew, F., Esq.
1874 July	1.	Drummond, Col. H., R. E.
1870 March	8.	†Duke of Edinburgh, His Royal Highness.
1867 June	5.	†Duthoit, W., Esq., C. S.
1871 March	1.	Dvijendranath Thakur, Bábu.
1868 May	6.	†Edgar, J. W., Esq., C. S. I., B. C. S.
1874 Dec.	2.	†Egerton, R. E., Esq., C. S.
1871 Dec.	2.	†Elliot, J., Esq., M. A.
1846 Jan.	7.	*Elliot, Sir Walter, late M. C. S.
1859 Nov.	2.	*Elliot, C. A., Esq., B. C. S.
1871 Oct.	4.	†Evezard, Col. G. E.
1868 Oct.	7.	Ewart, J., Esq., M. D.
1859 Dec.	7.	Fath Ali, Maulavi.
1851 May	7.	*Fayrer, Dr. J., C. S. I.
1868 Jan.	15.	†Feddén, Francis, Esq., Geol. Survey.
1868 May	6.	*Field, C. D., Esq., M. A., C. S.
1869 Sept.	1.	*Fisher, J. H., Esq., C. S.
1872 Dec.	4.	*Forbes, Major J. G., R. E.
1875 Jan.	6.	*Forbes, Capt. C. J. F. S., Depy. Comr.
1861 Feb.	6.	†Forest, R., Esq., Civil Engineer.
1869 Oct.	12.	*Forlong, Lieut.-Col. J. G. R., M. S. C.
1868 June	8.	Forsyth, The Hon. Sir T. D., K. C. S. I., C. B.
1871 Nov.	1.	†Foster, J. M., Esq., M. R. C. P.
1873 July	2.	†Fraser, Capt. E.
1869 Sept.	1.	*Fryer, Major G. E., Dy. Commissioner.
1867 Sept.	4.	Fyfe, The Rev. W. C.
1878 Dec.	8.	†Gamble, J. S., Esq.
1871 Aug.	2.	†Gangaprasad, Munshi.
1874 July	1.	*Gardner, D. M., Esq.
		Calcutta
		Lahore
		Europe
		Lucknow
		Calcutta
		Deoli
		Calcutta
		Delhi
		Samhalpur
		Calcutta
		Azimganj
		Calcutta
		Europe
		Calcutta
		Europe
		Calcutta
		Europe
		Calcutta
		Europe
		Mirzapur
		Calcutta
		Darjiling
		Lahore
		Allahabad
		Europe
		Europe
		Púna
		Calcutta
		Calcutta
		Europe
		Karáchi
		Europe
		Europe
		Europe
		Shwegyeen, B.
		Dehra [Burmah
		Europe
		Calcutta
		Nazira, Assam
		Bushire
		Europe
		Calcutta
		[jiling
		Pankabari, Dar-
		Moradabad
		Europe

Date of Election.		
1859 Aug.	3.	Gastrell, Col. J. E., Supdt. Rev. Survey.
1862 Feb.	5.	†Gauradās Baisák, Bábu.
1867 Sept.	4.	†Gauvain, Capt. V.
1867 Dec.	4.	Gay, E., Esq., M. A.
1859 Sept.	7.	Geoghegan, J., Esq., B. C. S.
1875 July	7.	†Girdlestone, C. E. R., Esq., C. S.
1869 Feb.	3.	†Giriprasád Singh, Thákur.
1861 Feb.	6.	*Godwin-Austen, Major H. H., Topographical Survey.
1872 Nov.	6.	Gordon, C. B. P., Esq.
1862 July	2.	*Gordon, Robert, Esq., C. E.
1869 July	7.	*Gordon, J. D., Esq., C. S. I., C. S.
1875 July	7.	†Gouldsbury, J. R. E., Esq.
1863 Nov.	4.	†Gowan, Lieut.-Col. J. Y.
1866 June	6.	Gribble, T. W., Esq., B. C. S.
1861 Sept.	4.	†Griffin, L. H., Esq., B. C. S.
1878 Aug.	6.	Girischandra Sinha, Kumara.
1861 Feb.	6.	†Growse, F. S., Esq., M. A., B. C. S.
1871 Jan.	4.	Gunendranath Thákur, Bábu.
Jan.	6.	†Gunn, S., Esq., M. B., Surg., Bengal Army.
1864 Dec.	5.	†Gurucharan Dás, Bábu.
		Calcutta Birbhum Calcutta Calcutta Nepal Allighar Europe Calcutta Europe Europe Montgomery Europe Calcutta. [jab Kapúrthala, Pan- Calcutta Mathurá Calcutta Masúri Krishnagur
1871 June	7.	Habíburrahmán, Maulavi.
1867 July	3.	†Hacket, C. A., Esq., Geol. Survey.
1869 April	3.	*Hæberlin, The Rev. C.
1855 March	7.	†Hamilton, R., Esq.
1861 March	1.	†Harachandra Chaudhuri, Bábu.
1866 Nov.	1.	Harendra Krishna Bahádur, Rájá.
1861 Feb.	2.	†Harrison, A. S., Esq., B. A.
1859 Oct.	6.	*Haughton, Col. J. C., C. S. I.
1862 Aug.	6.	*Heeley, W. L., Esq., B., A. C. S.
1874 Jan.	7.	Heintze, C., Esq.
1875 March	3.	†Hendley, Dr. T. H.
1875 Aug.	4.	†Hewitt, J. F. H., Esq., C. S.
1868 Aug.	5.	†Hobart, R. T., Esq., C. S.
1872 Dec.	4.	*Hœrnle, Rev. A. F. R., Ph. D.
1868 Nov.	4.	†Holroyd, Major W. R. M.
1873 Jan.	8.	†Houstoun, G. L., Esq.
1863 Jan.	15.	†Howell, M. S., Esq., C. S.
1866 Feb.	7.	Hoyle, G. W., Esq.
1867 Aug.	7.	†Hughes, T. H., Esq., A. R. S. M., F. G. S.
1873 March	5.	†Hughes, A. J., Esq., C. E.
1866 Jan.	17.	*Hughes, Captain W. G., M. S. C.
1870 Jan.	5.	Hume, Allan O., Esq., C. B., C. S.
1870 June	1.	*Hunter, W. W., Esq., LL.D., C. S.
1868 April	1.	Hyde, Col. H., R. E.
		Calcutta Geol. S. Office Europe Wardah Sherepur Calcutta Allahabad Europe Europe Calcutta Jaipur Mutíhari, Allahabad Europe Lahore Europe Benares Calcutta Geol. S. Office Byturm Europe Calcutta Europe Calcutta

Date of Election.		
1872 Dec. 4.	†Tbbetson, D. C. J., Esq., C. S.	Karnál, Panjáb
1866 March 7.	†Irvine, W., Esq., C. S.	Fatehgarh,
1871 March 8.	Isaac, T. S., Esq., C. E.	Calcutta
1858 Dec. 7.	†Isvariprasád Singh Bahádur, Raja.	Benares
1874 Feb. 4.	†Jackson, Dr. C. J.	Puri
1865 June 7.	†Jaykissen Dás Bahádur, Rájá, C. S. I.	Cawnpore
1878 Aug. 6.	Jogeshachandra Datta, Bábu.	Calcutta
1866 Feb. 7.	†Johnson, W. H., Esq.	Patna
1862 March 5.	*Johnstone, Major J. W. H.	Europe
1867 Dec. 4.	*Johnstone, Capt. J.	Europe
1878 Dec. 8.	†Johore, H. H., Maharaja of, K. C. S. I.,	New Johore,
		Singapore
1878 April 2.	†Jones, F., Esq.	Europe
1875 Nov. 8.	†Jones, S. S., Esq., B. A., C. S.	Sasseram
1869 April 7.	Kabiruddín Ahmad, Maulavi.	Calcutta
1871 May 8.	Káliprasanna Ghosh, Bábu.	Calcutta
1861 Dec. 4.	†Kempson, M., Esq., M. A.	Allahabad
1875 April 7.	†Kerr, Ralph, Major, Lord.	Mathura
1874 Dec. 2.	†Khudábaksh Khán, Maulavi.	Patna.
1867 Dec. 4.	King, G., Esq., M. B.	Calcutta
1867 March 6.	†King, Capt. H. W.	P. & O Co.'s Office
1862 Jan. 15.	King, W., Jr., Esq., Geol. Survey of India.	Geol. Surv. Office
1875 Dec. 1.	Knight, J. B., Esq.	Calcutta
1867 March 6.	†Knox, G. E., Esq., C. S.	Kirwi (Banda)
1860 May 5.	Kurz, S., Esq.	Calcutta
1859 Dec. 7.	*Leonard, H., Esq., M. A., C. E.	Europe
1870 July 6.	†Lethbridge, E., Esq., M. A.	Krishnagar
1869 June 2.	*Leupolt, J. C., Esq., C. S.	Europe
1878 Feb. 5.	Lewis, T. R., Esq., M. B.	Calcutta
1864 Nov. 2.	Locke, H. H., Esq.	Calcutta
1866 Jan. 17.	†Low, J., Esq., G. T. Survey.	Dehra Dun
1869 July 7.	Lyall, C. J., Esq., B. A., C. S.	Calcutta
1875 Jan. 6.	Lydekker, R., Geog. Survey of India.	Calcutta
1870 April 6.	†Lyman, B. Smith, Esq.	Japan
1866 June 6.	Macdonald, Lieut.-Col. J., Staff Corps.	Calcutta
1878 May 7.	*Mackay, W., Esq., C. S.	Europe
1878 Dec. 8.	McLeod, K., Esq., M. D.	Calcutta
1848 April 5.	†MacLagan, Major-General R., R. E., F. R. S. E., F. R. G. S.	Lahore
1867 July 8.	*Macnamara, Dr. C.	Europe
1868 Dec. 2.	†Macauliffe, M., Esq.	Jhalum
1874 Jan. 7.	†Magrath, C. F., Esq., C. S.	Bogra
1870 May 4.	†Macnaghten, C., Esq.	Rájkot Collage,
		Kattywar

Date of Election.			
1874 July	1.	Mallock, Major H. A.	Calcutta
1867 April	3.	Mahendralál Sircár, Dr.	Calcutta
1867 April	3.	Mainwaring, Lieut.-Col. G. B.	Calcutta
1852 Nov.	3.	Manickjee Rustamjee, Esq.	Calcutta
1872 Nov.	6.	†Man, E. H., Esq.	Port Blair
1869 July	7.	†Markham, A. M., Esq., C. S.	Allahabad
1874 Aug.	5.	†Marsh, Capt. H. C.	Allahabad
1873 July	2.	*Marshall, C. W., Esq.	Europe
1873 Aug.	6.	†Marshall, Lieut.-Col. W. E.	Simla
1876 April	4.	McConnell, Dr. J. F. P., Prof. Med. Coll.	Calcutta
1860 March	7.	†Medlicott, H. B., Esq., F. G. S.	Geol. Survey
1874 July	5.	†Michell, Capt. T. B.	Gauhati
1871 Sept.	6.	†Miles, Major S. B.	Muskat
1870 July	6.	Miller, A. B., Esq.	Europe
1867 June	5.	Milman, R., D. D., The Right Rev., Lord Bishop of Calcutta.	Calcutta
1874 May	6.	†Minchin, F. J. V., Esq.	Madras
1875 Aug.	4.	†Minchin, Lieut.-Col. C. C.	Bahawalpur
1874 July	1.	Molesworth, W. G., Esq., C. E.	Calcutta
1867 March	6.	*Montgomery, Major T. G., R. E.	Europe
1854 Dec.	6.	Morris, The Hon'ble, G. G., B. C. S.	Calcutta
1854 Oct.	11.	Muir, The Hon'ble Sir W., K. C. S. I., B. C. S.	Calcutta
1862 July	2.	†Napier of Magdala, H. E. Lord R., General G. C. S. I., G. C. B.	Simla
1865 Feb.	1.	Nevill, G., Esq., C. M. Z. S.	Calcutta
1871 Jan.	4.	*Newton, Isaac, Esq.	Europe
1872 May	1.	†Niranján Mukerji, Bábu.	Benaras
1869 July	7.	†Nursing Rao, A. V., Esq.	Vizagapatam
1871 July	5.	†Oates, E. W., Esq., C. E.	Pegu
1874 Oct.	4.	O'Kinealy, J., Esq., C. S.	Calcutta
1851 June	4.	Oldham, T., Esq., LL. D., F. R. S.	Calcutta
1873 Aug.	6.	Olpherts, W. J., Esq.	Calcutta
1864 Mar.	2.	Palmer, Dr. W. J.	Calcutta
1873 Aug.	6.	Parker, J. C., Esq.	Calcutta
1862 May	7.	Partridge, S. B., Esq., M. D.	Calcutta
1871 Dec.	6.	†Peal, S. E., Esq.	Sibsagar, Assam
1867 March	6.	Pearimohan Mukerji, M. A., Bábu.	Uttarpara
1860 Feb.	1.	*Pearse, Lieut.-Col. G. G.	Europe
1868 Nov.	4.	*Pearson, C. E., Esq., M. A.	Europe
1873 Aug.	6.	Pedler, A., Esq.	Calcutta
1869 July	7.	†Pell, S., Esq.	Ranigunge
1864 Mar.	2.	*Pellow, F. H., Esq.	Europe

Date of Election.		
1865 Sept.	6.	†Peppé, T. F., Esq.
1868 May	6.	Peterson, F. W., Esq.
1885 July	1.	*Phayre, Major-G., Sir A. P., K. C. S. I., C. B.
1864 Nov.	2.	Phear, The Hon'ble J. B.
1869 Feb.	3.	†Pickford, J., Esq., M. A.
1875 Feb.	8.	†Porter, W. J., Esq.
1868 April	1.	†Pramathanáth Ráy, Raja.
1872 Dec.	4.	Prananáth Sarasvati Pandit, B. L.
1869 Feb.	3.	Pratápachandra Ghosha, B. A.
1871 June	7.	*Pratt, Capt. C. S., Staff Corps.
1874 Dec.	2.	†Protheroe, Capt. M.
1856 Mar.	5.	Rájendralála Mitra, Bábu.
1871 June	7.	Rámakrishna Dás, Bábu.
1887 Feb.	1.	Rámanáth Tagor, The Hon. Rájá, C. S. I.
1874 Dec.	2.	†Rám Dás Sen, Bábu.
1860 Mar.	7.	†Reid, H. S., Esq., C. S.
1871 July	5.	†Reid, J. R., Esq., C. S.
1872 April	8.	Richards, Dr. V.
1868 April	1.	Robb, G., Esq.
1868 April	1.	*Robertson, C., Esq., C. S.
1874 May	6.	*Robinson, Col. D. G., R. E.
1865 Feb.	1.	Robinson, S. H., Esq.
1870 Jan.	5.	*Ross, Alexander G., Capt., Staff Corps.
1871 Dec.	6.	†Samuells, Capt. W. L.
1872 Feb.	7.	†Sashagiri Sastri, M. R. A.
1870 May	4.	Satyánand Ghoshál, Rájá.
1878 Jan.	8.	Schlegel, F., Esq.
1870 May	4.	†Schlich, Dr. W.
1869 Feb.	3.	Schwendler, L., Esq.
1874 July	1.	Scully, Dr. J.
1860 July	4.	†Shelverton, G., Esq.
1868 April	1.	†Showers, Lieut.-Col. C. L.
1872 Aug.	7.	†Skrefarud, Rev. L. O.
1864 Sept.	7.	†Sladen, Lieut.-Col. E. B.
1875 Feb.	3.	*Smidt, J., Esq.
1865 July	5.	†Smith, D. Boyes, Esq., M. D.
1874 June	3.	†Smith, V. A., Esq., C. S.
1864 Mar.	2.	*Spearman, Capt. H. R.
1872 July	3.	†Stephen, Carr, Esq.
1868 Sept.	2.	†Stewart, R. D., Esq.
1870 April	6.	Stewart, R., Esq.
1875 July	7.	Stewart, M. G., Esq.
1861 Sept.	4.	Stokes, Whitley, Esq.
1869 Feb.	3.	†Strachey, The Hon'ble Sir J., K. C. S. I.
		Ranchi
		Calcutta
		Mauritius
		Calcutta
		Madras
		Shwegyeen, B.
		Burmah
		Digapati
		Rhawánipur
		Calcutta
		Europe
		Port Blair
		Calcutta
		Calcutta
		Calcutta
		Berhampur
		Allahabad
		Azimghar
		Goalundo
		Calcutta
		Europe
		Europe
		Europe
		Calcutta
		Europe
		Tipperah
		Madras
		Calcutta
		Calcutta
		Calcutta
		Darjiling
		Calcutta
		Calcutta
		Waltair, near
		Vizagapatam
		Amballa
		Santhal Mission
		Rampur Haut
		Amberst
		Europe
		Dacca
		Hamirpur
		Europe
		Ludianah
		Raniganj
		Calcutta
		Calcutta
		Calcutta
		Calcutta

Date of Election.			
1859 Mar.	2.	†Stubbs, Lieut.-Col. F. W., Royal Artillery.	Dalhousie, Panjab
1858 July	7.	†Sutherland, H. C., Esq., B. C. S.	Backergunge
1864 Aug.	11.	Swinhoe, W., Esq.	Calcutta
1865 Sept.	6.	Tawney, C. H., Esq., M. A.	Calcutta
1865 April	5.	Taylor, R., Esq.	Calcutta
1874 Mar.	4.	Taylor, Commander A. D., late Indian Navy.	Calcutta
1860 May	2.	Temple, The Hon'ble Sir R., K. C. S. I., B. C. S.	Calcutta
1859 Mar.	2.	†Theobald, W., Esq., Geological Survey.	
1875 June	2.	†Thibaut, Dr. G.	Benares
1869 Oct.	6.	†Thomson, A., Esq.	Faizabad
1875 Nov.	3.	†Thomson, R. G., Esq., C. S.	Sirsa
1847 June	2.	Thuillier, Col. H. L., R. A., C. S. I., F. R. S.	Calcutta
1865 July	5.	†Tolbort, T. W. H., Esq., C. S.	Jhang, Panjab
1875 April	7.	†Touche La, Capt. E. N. D.	Sámagúting, As- Europe [sam
1871 April	5.	*Trefftz, Oscar, Esq.	Muzaffargarh
1861 June	5.	†Tremlett, J. D., Esq., M. A., C. S.	Indor
1872 July	3.	†Trevor, W. S., Lieut.-Col. R. E.	Calcutta
1873 April	2.	Turnbull, R., Esq.	Calcutta
1861 Sept.	4.	Tween, A., Esq., Geological Survey.	Europe
1863 May	6.	*Tyler, Dr. J.	
1869 June	2.	Udaychánd Datt, Bábu.	Calcutta
1873 April	2.	Umesh Chunder Dutt, Bábu.	Calcutta [Khan
1873 May	7.	†Urmston, H. B., Lieut.	Dehra Ismail
1860 May	2.	*Vanrenen, Major A. D., Bengal Staff Corps.	Europe
1864 Feb.	3.	†Verchère, A. M., Esq., M. D.	Benares
1864 April	6.	†Vijayaráma Gujapati Raj Munniá Sultán Bahádur, Maharájah Mirza Vijayana- garam.	Benares
1870 June	1.	†Vrindávanachandra Mandala, Bábu.	Balasor
1871 Feb.	1.	*Waagen, Dr. W., Geological Survey.	Europe
1869 Aug.	4.	Wáhid Alí, Prince Jahán Qadr Muhammad Bahádur.	Garden Reach
1865 Nov.	1.	Waldie, D., Esq., F. G. S.	Calcutta
1861 May	1.	†Walker, Col. J. T., R. E., F. R. S.	Dehra Doon
1875 April	7.	Wall, Dr. A. J., B. Medical Service.	Calcutta
1863 Oct.	7.	Waller, W. K., Esq., M. B.	Calcutta
1865 May	3.	Waterhouse, Capt. J., B. S. C.	Calcutta
1874 July	1.	Watt, Dr. George.	Hughli
1869 Sept.	1.	†Westland, J., Esq., C. S.	Nagpur
1867 Feb.	6.	†Westmacott, E. V., Esq., B. A., C. S.	Dinajpur
1862 Oct.	8.	*Wheeler, J. T., Esq.	Europe.
1873 April	2.	†White, E., Esq., C. S.	Bijnour

Date of Election.			
1875 Feb.	8.	†Whiteway, R. S., Esq., C. S.	Muttra
1867 Aug.	7.	†Wilcox, F., Esq.	Purulia
1873 Jan.	8.	†Williams, H. C., Esq., C. S.	Wardha
1873 May	7.	†Williams, G. R. C., Esq., C. S.	Banda
1867 Jan.	16.	†Williamson, Capt W. J.	Garo Hills
1867 Mar.	6.	Willson, W. G., Esq., B. A.	Calcutta
1871 Mar.	1.	†Willson, James, Esq.	Bankipur
1870 Aug.	3.	Wilson, R. H., Esq., C. S.	Calcutta
1866 Mar.	7.	*Wise, Dr. J. F. N.	Europe
1867 July	3.	†Wood, Dr. J. J.	Rānchi
1874 Mar.	4.	Wood, C. H., Esq.	Calcutta
1870 Jan.	5.	Wood-Mason, J., Indian Museum.	Calcutta
1873 Aug.	6.	†Woodthorpe, Lieut. R. G., R. E.	Nāga Hills
1869 Sept.	1.	Yadulāl Mullik, Bābu.	Calcutta
1868 June	3.	Yatindramohan Tagore, Rājāh Bahādūr.	Calcutta.
1867 Mar.	6.	†Yogendranāth Mallik, Bābu.	Andul
1862		*Yule, Col. H., R. E.	London
HONORARY MEMBERS.			
1825 Mar.	9.	M. Garcin de Tassy, Memb. de l'Institut.	Paris
1821 "	6.	Sir John Phillippart.	London
1826 July	1.	Count de Noe.	Paris
1831 "	7.	Prof. C. Lassen.	Bonn
1835 May	6.	Prof. Lea.	Philadelphia
1843 Mar.	30.	Prof. Jules Mohl, Memb. de l'Institut.	Paris
1847 Sept.	1.	Col. W. Munro.	London
1847 Nov.	3.	His Highness the Nawab Nazim of Bengal.	Murshidabad
1848 Feb.	2.	Dr. J. D. Hooker.	Kew
1848 Mar.	8.	Prof. Henry.	Princeton U. S.
1853 April	6.	Major-Gen. Sir H. C. Rawlinson, K. C. B.	London
1858 July	6.	B. H. Hodgson, Esq.	Europe
1859 Mar.	2.	The Hon'ble Sir J. W. Colville, Kt.	Europe
1860 "	7.	Prof. Max Muller.	Oxford
1860 Nov.	7.	Mons. Stanislas Julien.	Paris
1860 "	7.	Dr. Robert Wight.	London
1860 "	7.	Edward Thomas, Esq.	London
1860 "	7.	Dr. Aloys Sprenger.	Bern
1860 "	7.	Dr. Albrecht Weber.	Berlin
1868 Feb.	5.	Genl. A. Cunningham, C. S. I.	India
1868 "	5.	Prof. Bāpu Dēva Sāstri.	Benares
1868 "	5.	Dr. T. Thomson.	London
1868 "	2.	A. Grote, Esq.	London
1871 "	7.	Charles Darwin, Esq.	London
1872 "	1.	Sir G. B. Airy.	London
1872 June	5.	Prof. T. H. Huxley.	London
1875 Nov.	8.	Dr. O. Bohtlingk.	Jena
1875 "	8.	Prof. J. O. Westwood.	Oxford

CORRESPONDING MEMBERS.

Date of Election.			
1844	Oct. 2.	Macgowan, Dr. J.	Europe
1850	June 4.	Kramer, Herr A. von.	Alexandria
1856	" 8.	Porter, Rev. J.	Damascus
1856	" 4.	Schlagintweit, Herr H. von.	Munich
1856	" 4.	Smith, Dr. E.	Beirut
1859	" 4.	Taylor, J., Esq.	Bussorah
1857	Mar. 4.	Neitner, J., Esq.	Ceylon
1858	" 3.	Schlagintweit, Herr R. von.	Gieson
1859	Nov. 2.	Frederick, Dr. H.	Batavia
1859	May 4.	Bleeker, Dr. H.	Europe
1860	Feb. 1.	Baker, The Rev. H.	E. Malabar
1860	" 1.	Swinhoe, R., Esq., H. M.'s Consul.	Amoy
1860	April 4.	Haug, Dr. M.	Munich
1861	July 3.	Gosche, Dr. R.	
1862	Mar. 5.	Murray, A., Esq.	London
1863	July 1.	Barnes, R. H., Esq.	Ceylon
1866	May 7.	Schlagintweit, Prof. E. von.	Munich
1866	" 7.	Sherring, Rev. M. A.	Benares
1868	Feb. 5.	Foucaux, M. F. H.	Paris
1868	" 5.	Holmboe, Prof.	Christiania

ASSOCIATE MEMBERS.

1865	May 3.	Dall, Rev. C. H.	Calcutta
1871	Feb. 4.	Schaumburgh, J., Esq.	Calcutta
1871	April 1.	Lafont, Rev. F. E., S. J.	Calcutta
1875	Dec. 1.	Bate, Rev. J. D.	Allahabad
1875	" 1.	Moulvie Abdul Hai.	Calcutta

LIST OF MEMBERS WHO HAVE BEEN ABSENT FROM INDIA THREE YEARS AND UPWARDS.*

Rule 14, A.—In the event of an ordinary Member leaving India, and in the further event of his informing the Secretary by letter that he has no intention of returning, but desires to retain his privileges as an Ordinary Member, his subscription shall be 12 Rupees per annum, commutable into a single payment of Rs. 100, provided that if any such Member shall hereafter return to India, he shall thereupon become liable to pay his original subscription, subject to the operation of rule 10 B.

Rule 14, B.—After the lapse of three years from the date of a Member leaving India, if no intimation of his wishes shall, in the interval, have been received by the Society, his name shall be removed from the list of Members.

Date of leaving India.
1872.

Butcher, W. D., Esq.
Cooke, H. G., Esq., U. S.
Court, Major, M. H.
Drew, F., Esq.
Hamilton, R., Esq.

* These names will be removed from the next list of Members unless intimation is meanwhile received from the member of his desire to retain the privileges of an ordinary member under the operation of Rule 14, A.

LOSS OF MEMBERS DURING 1875.

BY RETIREMENT.

E. D. Lockwood, Esq.	Monghyr.
R. T. St. John, Esq.	Bassein.
Sir W. J. Herschel.	Cooch Behar.
Lieut. W. S. S. Bisset.	Calcutta.
Col. O. Hamilton.	Calcutta.
S. C. Bayley, Esq., C. S.	Patna.
W. Heilgers, Esq.	Calcutta.
H. M. Durand, Esq.	Bhagulpur.
T. F. Harkness, Esq.	Etah.
A. P. Howell, Esq., C. S.	Calcutta.
J. Kimber, Esq.	Calcutta.
J. Sims, Esq.	Delhi.
A. C. Lyall, Esq.	Calcutta.
Babu Gangapersad Sing.	Calcutta.
The Rev. J. Hector.	Calcutta.
E. Benedict, Esq.	Calcutta.
Dr. P. F. Bellew.	Bombay.
Capt. J. C. Ross, R. E.	Cawnpore.
G. T. Peppe, Esq.	Pachamba.
Babu Govindo Coomar Chaudri.	Sherpur.
T. W. Bourne, Esq.	Calcutta.
A. D. B. Gomes, Esq.	Calcutta.
C. B. Clarke, Esq.	Darjiling.
Raja Chundranath Roy.	Natore.
R. Knight, Esq.	Calcutta.

BY DEATH.

Ordinary Members.

Lieut. W. A. Holcombe.	Assam.
J. H. Haworth, Esq.	Calcutta.
Lieut.-Col. T. C. Hamilton.	Rangoon.

Honorary Members.

Dr. Ewald.	Europe.
The Right Hon'ble Sir E. Ryan, Kt.	Europe.

Associate Member.

Sayyid Karámat Ali.	Hughli.
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Corresponding Member.

Dr. Wilson.	Bombay.
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ELECTION CANCELLED.*

Amír Hussin Khán Bahádur.
 C. F. Bligh, Esq.
 G. C. Farr, Esq.
 J. W. Johnstone, Esq., M. D.
 Babu Mohima Chundra Chackarvatty.
 E. O'Brien, Esq.
 Bábu Satyadyal Banerjea.
 Bábu Vepena Vehary Mukerji.
 B. O'Brien, Esq.

* These names should have been included in the list for 1874. **Ed.**

. [APPENDIX.]

ABSTRACT STATEMENT
OF
RECEIPTS AND DISBURSEMENTS
OF THE
ASIATIC SOCIETY OF BENGAL
FOR
THE YEAR 1875.

STATEMENT, *Abstract of the Cash Account*

RECEIPTS.				1875.	1874.
BALANCE OF 1874.					
In the Bank of Bengal, viz.					
Account of Stoliczka Memorial					
Fund, ..	Rs.	1,201	3 6		
Account of Asiatic Society, ..		5,655	8 8		
			<u>6,856</u>	12 2	
Cash in hand, ..			161	0 1	
				<u>7,018</u>	5 3
ADMISSION FEES.					
Received from Members, ..		930	0 0		
				<u>930</u>	0 0 1,182 0 0
SUBSCRIPTIONS.					
Received from Members, ..		9,760	15 0		
				<u>9,760</u>	15 0 8,729 3 0
PUBLICATIONS.					
Sale proceeds of Journal and Proceedings, ..		676	2 6		
Subscriptions to ditto, ..		1,025	4 0		
Refund of Postage Stamps, ..		22	3 6		
Ditto of Freight, ..		4	0 0		
Ditto of the price of 70 Copies of Plates, ..		2	0 0		
				<u>1,729</u>	10 0 2,126 8 7
LIBRARY.					
Sale proceeds of Books, ..		375	12 0		
Refund of Freight, ..		33	0 0		
Ditto of Postage, ..		2	9 0		
				<u>411</u>	14 0 412 12 6
SECRETARY'S OFFICE.					
Saving of Salary, ..		19	0 9		
Received fine, &c., ..		1	0 0		
Ditto Commission on Purchase of Postage					
Stamps, ..		4	14 9		
				<u>24</u>	15 6 22 12 9
VESTED FUND.					
Interest on the Government Securities from					
the Bank of Bengal, ..		449	0 0		
				<u>449</u>	0 0 449 0 0
BUILDING.					
Received from the Right Hon'ble the Secre-					
tary of State for India, being the Special					
House allowance granted by the Govern-					
ment from 1st December, 1874 to 30th No-					
vember, 1875, at 400 Rs. per month, ..		4,800	0 0		
				<u>4,800</u>	0 0 4,800 0 0
DR. STOLICZKA MEMORIAL FUND.					
Received Subscriptions to the Fund, ..		1,350	0 0		
				<u>1,350</u>	0 0 1,240 0 0
Carried over, Rs.				26,474	11 9

No. 1.

of the Asiatic Society for 1875.

DISBURSEMENTS.		1875.	1874
PUBLICATIONS.			
Paid Freight for sending Journal and Proceedings, ..	Rs	78 11 0	
Ditto Lithographing and Engraving charges, &c., ..		2,683 15 1	
Ditto Printing charges, ..		3,967 6 9	
Ditto Commission sale of Books, &c., ..		54 6 6	
Ditto Purchase of Postage Stamps, ..		302 12 6	
Ditto Packing charges, ..		18 6 6	
Ditto Purchase of Journal, ..		10 0 0	
Ditto Paper for Plates, ..		211 15 0	
Ditto Journal binding, ..		7 8 0	
Ditto Telegram to A. Grote, Esq., ..		31 14 0	
Ditto Petty charges, ..		6 2 9	
		<hr/>	
		7,373 2 1	7,440 11 8
LIBRARY.			
Paid Salary of Librarian, ..		1,400 0 0	
Ditto Establishment, ..		120 0 0	
Ditto Commission on sale of Books, ..		32 5 3	
Ditto Landing charges, ..		9 15 3	
Ditto Book Binding, ..		270 0 0	
Ditto Salary of Punkhaman, ..		38 13 3	
Ditto Insufficient and Bearing Postage, ..		2 0 0	
Ditto Subscription to the Calcutta Review, ..		32 0 0	
Ditto Ditto to the Stray Feathers, ..		11 0 0	
Ditto Ditto for two Copies of the Rev. J. D. Bate's Hindi Dictionary, ..		30 0 0	
Ditto Extra attendance in the Library in the morning, ..		60 0 0	
Ditto Binding two Copies of Blank Books, ..		4 0 0	
Ditto Advertising charges, ..		1 4 0	
Ditto Purchase of Books, through Messrs. Trubner and Co., ..	1,679 4 9		
Ditto Ditto of ditto in Calcutta, ..	213 0 5		
		<hr/>	
		1,892 5 2	
Ditto for Preparing an English Catalogue of the Library Books, ..		387 0 0	
Ditto Printing charges, ..		59 12 0	
Ditto Purchase of two glass-door Almirah, ..		74 7 0	
Ditto Freight, ..		25 9 1	
Ditto Petty charges, ..		24 15 6	
		<hr/>	
		4,475 6 6	2,732 2 9
SECRETARY'S OFFICE.			
Paid General Establishment, ..		390 0 0	
Ditto Secretary's Establishment, ..		2,119 0 0	
Ditto Purchase of Postage Stamps, ..		96 4 6	
Ditto Insufficient and Bearing Postage, ..		2 9 6	
Ditto Meeting charges, ..		136 1 6	
Ditto Commission on Subscription Collected, ..		43 13 0	
Ditto Subscription to the Army List, ..		16 0 0	
		<hr/>	
		2,803 12 6	
		<hr/>	
		Carried over, Rs. 11,848	8 7

RECEIPTS.

1875.

1874.

Brought over, Rs.

26,474 11 9

MISCELLANEOUS.

Fund account,	..	..	1,018	7	4				
O. P. Fund,	..	..	477	5	6				
The Government North-Western Provinces, ..			15	3	0				
H. F. Blanford, Esq.	..	..	12	6	0				
B. Quaritch, Esq.	..	..	5	1	0				
S. Kurz, Esq.	..	..	4	0	0				
W. Stokes, Esq.	..	..	0	9	0				
L. Schwendler, Esq.	..	..	9	7	0				
H. Blochmann, Esq.	..	..	9	0	0				
F. S. Growae, Esq.	..	..	6	5	0				
Major R. Delbourbel,	..	..	0	8	0				
The Rev. J. D. Bate,	..	..	0	9	0				
W. Thoobald, Esq.	..	..	29	0	0				
Moncy Lal Bysack,	..	..	472	9	6				
W. J. Porter, Esq.	..	..	1	13	0				
Major G. E. Fryer,	..	..	11	6	0				
S. E. Peal, Esq.	..	..	18	0	0				
J. Sims, Esq.	..	..	0	8	0				
Capt. J. Butler,	..	..	1	6	0				
W. Irvine, Esq.	..	..	11	14	6				
A. Anderson, Esq.	..	..	9	7	0				
Dr. D. Waldin,	..	..	3	6	0				
D. C. J. Ibbotson, Esq.	..	..	19	2	0				
J. Wood-Mason, Esq.	..	..	8	8	0				
Col. E. T. Dalton,	..	..	9	9	3				
C. W. Marshall, Esq.	..	..	3	13	0				
The Rev. S. B. Fairbank,	..	..	19	8	0				
M. Macauliffe, Esq.	..	..	8	5	0				
Carr. Stephen, Esq.	..	..	0	14	0				
Yusuf Ali Munshi,	..	..	25	0	0				
G. H. F. Jameson, Esq.	..	..	2	4	0				
Lt.-Col. James Burn,	..	..	50	0	0				
Col. W. E. Marshall,	..	..	26	0	0				
A. M. Markham, Esq.	..	..	16	11	0				
						2,307	0	1	1,621 4 2

Carried over, Rs. 28,781 11 10

DISBURSEMENTS.		1875.	1874.
Brought over, Rs.		2,808 12 6	11,848 8 7
Paid Salary of Mali,	..	57 9 6	
Ditto Subscription to the Calcutta Directory, ..	..	14 0 0	
Ditto Printing charges, ..	..	47 0 0	
Ditto Pension to Islam Khan, ..	..	36 0 0	
Ditto for two Oaler's patent double-light plated Reading Lamps, ..	..	112 0 0	
Ditto Fee to the Bank of Bengal for Stamping Cheques, ..	..	1 9 0	
Ditto Two Copies of Almanac, ..	..	2 0 0	
Ditto Stationery, ..	..	16 14 6	
Ditto Binding Blank Books, ..	..	17 0 0	
Ditto ditto Letter Files, ..	..	8 0 0	
Ditto the Rev. F. C. Lafont being the amount voted by the Society towards the erection of a Spectroscopic Observatory, ..	..	500 0 0	
Ditto Repairing and cleaning a French Eight- day Clock, ..	..	18 12 0	
Ditto Mustard Oil, Chirags for Illumination of the Society's Premises, ..	..	50 15 9	
Ditto Advertising charges, ..	..	42 8 0	
Ditto Petty charges, ..	..	41 8 6	
		<u>3,769 9 9</u>	3,119 8 10
VESTED FUND.			
Purchase of 4 per cent. Govern- ment Paper, ..	..	3,000 0 0	
Paid Premium on ditto, ..	..	63 12 0	
Ditto Commission ditto, ..	..	7 9 10	
		<u>3,071 5 10</u>	
Less Interest on 3,000 Rs. at 4 per cent. ..	..	17 5 4	
		<u>3,054 0 6</u>	
Purchase of 4 per cent. Govern- ment Paper, ..	..	1,000 0 0	
Paid Premium on ditto, ..	..	21 4 0	
Ditto Commission on ditto, ..	..	2 8 8	
		<u>1,023 12 8</u>	
Less Interest on 1,000 Rs. at 4 per cent. ..	..	5 5 4	
		<u>1,018 7 4</u>	
Ditto Commission on collecting Interest on Government Securities, ..	..	1 1 10	
		<u>4,073 9 8</u>	1,640 5 5
BUILDING.			
Paid House rate, ..	..	402 0 0	
Ditto Police and Lighting rate, ..	..	234 0 0	
Ditto Water rate, ..	..	235 3 1	
Ditto Repairing charges, ..	..	137 9 6	
		<u>1,008 12 7</u>	919 13 10
COIN FUND.			
Purchase of Yarkand Coins, ..	..	350 0 0	
Ditto of a Gold Coin, ..	..	25 0 0	
Ditto Postage Expenses for returning Coins, ..	..	1 4 0	
		<u>376 4 0</u>	286 0 0
Carried over, Rs.		21,076 12 7	

RECEIPTS.

1875.

1874.

Brought over, Rs. 28,781 11 10

Carried over, Rs. 28,781 11 10

DISBURSEMENTS.

1875.

1874.

Brought over, Rs. 21,076 12 7

DR. STOLICZKA MEMORIAL FUND.

Paid Printing charges of Circulars, ..	32 14 0		
Ditto ditto of List of Subscribers, ..	12 0 0		
Ditto Telegram to A. Grote, Esq., ..	23 6 0		
Ditto Postage for sending Letters and Circulars, &c., ..	5 14 6		
Ditto Messrs. Prescott, Grote, Cave and Co., by a Bill of Exchange on the Oriental Bank Corporation, London, £150 at 1/9/8 per rupee, ..	1,664 11 10		
		1,738 14 4	38 12 0

MISCELLANEOUS.

Fund Account, ..	1,182 0 0		
O. P. Fund, ..	116 10 5		
The Government North-Western Provinces, ..	13 8 0		
Money Lal Bysack, ..	434 9 6		
Capt. E. Fraser, ..	0 4 10		
Major F. W. Stubbs, ..	0 4 0		
James Beames, Esq., ..	21 8 0		
Lieut. W. A. Holcombe, ..	1 0 0		
W. J. Porter, Esq., ..	2 2 7		
F. S. Growse, Esq., ..	6 5 0		
Major L. R. Kerr, ..	0 8 0		
R. Brown, Esq., ..	1 7 0		
T. W. H. Tolbort, Esq., ..	2 6 0		
L. Schwondlor, Esq., ..	9 7 0		
H. Blochmann, Esq., ..	18 0 0		
D. C. J. Ibbetson, Esq., ..	5 0 0		
Capt. C. J. F. S. Forbes, ..	0 13 0		
Capt. W. L. Samuella, ..	3 11 0		
T. W. Bourne, Esq., ..	0 9 6		
W. Theobald, Esq., ..	29 6 0		
W. Irvine, Esq., ..	7 0 0		
Lt.-Col. W. E. Marshall, ..	31 9 0		
Major R. DeBourbel, ..	0 14 6		
J. R. Reid, Esq., ..	0 9 0		
S. E. Peal, Esq., ..	0 5 0		
M. Macauliff, Esq., ..	6 10 0		
E. Lethbridge, Esq., ..	1 5 3		
E. T. Atkinson, Esq., ..	0 14 0		
V. A. S. Smith, Esq., ..	1 0 0		
Major G. E. Fryer, ..	20 8 0		
J. Sime, Esq., ..	0 7 9		
S. Kurz, Esq., ..	4 0 0		
E. V. Westmacott, Esq., ..	1 2 0		
W. T. Blanford, Esq., ..	0 4 0		
Dr. G. Thibaut, ..	1 4 0		
W. Stokes, Esq., ..	0 7 0		
T. Chennell, Esq., ..	0 8 0		
James Low, Esq., ..	0 6 0		
W. W. Hunter, Esq., ..	1 8 0		
H. F. Blanford, Esq., ..	12 8 0		
Lieut.-Col. James Burn, ..	2 0 0		
Capt. F. J. Graham, ..	2 14 0		
		1,947 5 4	1,189 11 1

Carried over, Rs. 24,768 0 3

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RECEIPTS.

1875.

1874.

Brought over, Rs. 28,781 11 10

Rs. 28,781 11 10

Examined and found correct,
DAVID WALDIE,
E. GAY.

ASIATIC SOCIETY'S ROOMS,
Calcutta, Jan. 1st 1876.

DISBURSEMENTS.

1876.

1874.

Brought over, Rs. 24,763 0 3

BALANCE.

In the Bank of Bengal, viz.

Account of Stoliczka Memorial

Fund, .. 812 5 2

Account of Asiatic Society of

Bengal, .. 3,045 13 1

Cash in hand, ..

3,858 2 3

160 9 4

4,018 11 7

Rs. 28,781 11 10

Examined and found correct.

DAVID WALDIE,
E. GAY.

ASIATIC SOCIETY'S ROOMS,
Calcutta, Jan. 1st. 1876.

STATEMENT, *Abstract of the Cash Account,*

	RECEIPTS.	1875.	1874.
BALANCE OF 1874.			
In the Bank of Bengal, viz.			
Conservation of Sanskrit MSS.,	4,832 8 8		
Dr. J. Muir, ..	898 10 0		
O. P. Fund, ..	261 0 0		
	<u>5,992 8 8</u>		
Cash in hand, ..	125 3 1		
		6,117 12 7	
ORIENTAL PUBLICATIONS.			
Received by sale of Bibliotheca Indica and by			
Subscription to ditto, ..	2,820 10 3		
Ditto Refund of Postage, ..	33 9 0		
Ditto Refund of Freight, ..	9 3 0		
	<u>2,872 6 3</u>	2,271 1 6	
GOVERNMENT ALLOWANCE.			
Received from the General Treasury at 500 Rs.			
per month, ..	6,000 0 0		
Ditto ditto Additional grant for the publication of Sanskrit Works at 250 per month,	3,000 0 0		
	<u>9,000 0 0</u>	9,000 0 0	
CUSTODY OF ORIENTAL WORKS.			
Received by transfer to the Asiatic Society of			
Banghy expenses for returning a package			
of MSS. to Munshi Rumnarain, Barcily College			
on the 17th August, 1875, ..	0 6 0		
Saving of Salary, ..	1 12 0		
	<u>2 2 0</u>		
Asiatic Society of Bengal, ..	116 10 5		
Hitalal Missiri, ..	1 1 0		
Braj Bhushan Das, ..	108 10 0		
Buddinath Chowdhury, ..	2 12 0		
Harendra Coomar Chowdhury, ..	0 12 0		
Kedarnath Banerjee, ..	30 0 0		
F. S. Growse, Esq. ..	2 0 0		
Kasainath Trambuck Telany, ..	19 11 0		
Major G. E. Fryer, ..	3 2 0		
Juggomohun Tarkaratna, ..	8 0 0		
Col. E. T. Dalton, ..	0 11 0		
	<u>293 5 5</u>	394 8 4	
CONSERVATION OF SANSKRIT MSS.			
Received from the Government of Bengal, the			
Amount sanctioned towards the Conservation			
of Sanskrit MSS. being 2nd Half of 1874-75, ..	1,600 0 0		
Ditto ditto being 1st Half of 1875-76, ..	1,600 0 0		
Sale proceeds of 20 Copies Notices of Sanskrit			
MSS., ..	20 0 0		
Refund of the amount from Babu Rajendralala			
Mitra, paid on the 8th October, 1874, as an			
advance for Purchase of Sanskrit MSS., ..	1,200 0 0		
	<u>4,420 0 0</u>		
		Carried over, Rs. 18,285 11 0	

No. 2.

Oriental Publication Fund, 1875.

DISBURSEMENTS.			1875.	1874.
ORIENTAL PUBLICATIONS.				
Paid Commission on Sale of Books, &c.,	..	175 7 3		
Ditto Packing charges,	..	3 6 0		
Ditto Postage Stamps,	..	55 7 0		
Ditto Freight,	..	71 8 0		
Ditto advertising charges,	..	462 3 9		
Ditto Banghee Expenses,	..	2 10 0		
Ditto Petty charges,	..	3 7 0		
			774 1 0	687 3 1
CUSTODY OF ORIENTAL WORKS.				
Paid Salary of the Librarian,	..	500 0 0		
Ditto Establishment,	..	721 0 0		
Ditto Fee for Stamping cheques,	..	3 2 0		
Ditto Book-binding,	..	55 4 0		
Ditto Insufficient Postage,	..	0 8 0		
Ditto Banghee Expenses,	..	0 14 0		
Ditto Petty charges,	..	7 0 0		
			1,291 2 0	1,273 6 9
LIBRARY.				
Paid Purchase of MSS.	..	6 6 6		
			6 6 6	494 11 0
CATALOGUE OF SANSKRIT MSS.				
Paid Salary for Cataloguing Sanskrit MSS.,	..	360 0 0		
			360 0 0	358 0 0
COPYING CHARGES.				
Paid Copying MSS.,	..	157 0 3		
			157 0 3	19 4 0
Kitāb al Akbarī.				
Paid Editing charges,	..	96 0 0		
			96 0 0	1,011 12 0
AGNI-PURĀNA.				
Paid Editing and Printing charges,	..	658 0 0		
			658 0 0	976 10 6
GORHILLIYA GRIHYA SŪTRA.				
Paid Editing charges,	..	110 0 0		
Ditto Postage,	..	0 5 0		
			140 5 0	224 0 0
MĪMĀMSĀ DARŚANA.				
Paid Editing and Printing charges,	..	305 0 0		
			305 0 0	147 6 0
SĀHITYA DARPAṆA.				
Paid postage,	..	0 6 0		
			0 6 0	
AKAŚHĀMĀH.				
Paid Editing and Printing charges,	..	688 0 0		
			688 0 0	
FARHANGI RASHIDĪ.				
Paid Editing and Printing charges,	..	929 8 0		
Ditto Banghee, expenses,	..	6 4 0		
			935 12 0	779 0 0
Carried over, Rs.			5,412 0 0	

	RECEIPTS.	1875.	1874.
Brought over, Ra.	4,420 0 0	18,285 11 0	
Refund of the amount from Ramdas Chucker- butty paid for purchase of Sanskrit MSS.,...	35 0 0		
Ditto ditto from the Travelling Pandit, paid as an advance on account of his travel- ling expenses to proceed to Burdwan, ..	20 0 0		
	<hr/>	4,475 0 0	4,711 0 0

Carried over, Ra.

22,760 11 0

DISBURSEMENTS.		1875.	1874.
Brought over, Rs.		5,412 0 9	
SĀMA VEDA.			
Paid Editing and Printing charges,	..	1,220 0 0	
Ditto Postage,	..	0 10 0	
		<hr/>	1,320 10 0 608 7 0
KLAMGIR-NĀMAH.			
Paid Editing charges for an Index of names of persons,	..	47 8 0	
		<hr/>	47 8 0 241 2 0
BIOGRAPHICAL DICTIONARY OF PERSONS WHO KNEW MOHAMMED.			
Paid Editing charges,	..	25 0 0	
		<hr/>	25 0 0
ĀTARENYA KRANTAKA.			
Paid Editing and Printing charges,	..	353 0 0	
		<hr/>	353 0 0
PINGĀLA CĪHANDA SUTRA.			
Paid Printing charges,	..	125 12 0	
		<hr/>	125 12 0 140 0 0
HAFT ĀSMĀN.			
Paid Printing charges,	..	316 11 0	
		<hr/>	316 11 0 128 4 0
KĀTANTRA.			
Paid Printing charges,	..	316 14 2	
		<hr/>	316 14 2 1,440 9 0
CHATURVARGA CHINTĀMANI.			
Paid Editing and Printing charges.	..	610 0 0	
		<hr/>	610 0 0 344 11 0
TARAKAT I NĀSIRĪ.			
Paid Freight and Cooley hire to Messrs. Sykes and Co.	..	2 12 0	
		<hr/>	2 12 0
Asiatic Society of Bengal,	..	477 5 6	
Buddinath Chaudhury,	..	3 0 0	
Kassinath Trambuck Telany,	..	19 11 0	
F. Keilhorn, Esq.	..	3 0 0	
T. W. H. Tolbort, Esq.	..	5 14 0	
Braj Bhushan Das,	..	104 6 0	
F. S. Growse, Esq.	..	2 0 0	
		<hr/>	615 4 6 666 1 4
CONSERVATION OF SANSKRIT MSS.			
Paid Salary for preparing Catalogue of Sanskrit MSS.	..	360 0 0	
Ditto ditto for translating the Sanskrit Catalogue,	..	240 0 0	
Ditto ditto for Travelling Pandit,	..	650 0 0	
Ditto Copying MSS.	..	95 10 0	
Ditto Banghy expenses,	..	1 4 0	
Ditto Printing charges of Notices Sanskrit MSS., Vol. III., Part II.	..	398 4 0	
Ditto, Contingent charges for Travelling Pandit, Do., for Purchase of Sanskrit MSS. Rs. 1,121-2-0	..	59 9 3	
Travelling, Brokerage, Packing, &c. 460-9-0	..	1,581 11 0	
Ditto, Postage for sending Notices of Sanskrit MSS.	..	15 4 0	
Ditto, Purchase of 3 Glass cases,	..	103 7 0	
Ditto, Salary for Bearer,	..	70 0 0	
		<hr/>	3,575 1 3
Carried over, Rs.		9,045 8 5	

RECEIPTS.	1875.	1874.
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Brought over, Rs. 22,760 11 0

Rs. 22,760 11 0

Examined and found correct.
 DAVID WALDIE,
 E. CLAY.

ASIATIC SOCIETY'S ROOMS
 Calcutta, 1st Jan. 1876.

DISBURSEMENTS.

1875.

1874.

	Brought over, Rs.	3,575	1	3	9,045	8	5
Ditto Repairing Oriental writing in chalk Lithographing 100 copies in Tint Black on paper,	..	86	0	0			
Ditto Freight for sending Notices of Sanskrit MSS.	..	14	14	0			
Ditto Advertising charges,	..	12	0	0			
Ditto Transfer of 5 copies of Notices of Sanskrit MSS in exchange of Kātantara,	..	5	0	0			
Ditto advanced to Travelling Pandit on account of his expenses to proceed to Burdwan,	..	20	0	0			
Ditto Babu Rajendralala Mitra, as advance of his travelling expenses and for purchase of Sanskrit MSS.	..	1,200	0	0			
Ditto Petty charges,	..	24	8	6			
					4,937	7	9
					13,983	0	2

BALANCE.

In the Bank of Bengal, viz.

Conservation of Sanskrit MSS.	4,370	0	11				
Dr. J. Muir,	..	898	10	0			
O. P. Fund,	..	3,361	8	6			
		8,633	3	5			
Cash in hand,	..	111	7	5			
					8,777	10	10
					Rs. 22,760	11	0

Examined and found correct.

DAVID WALDIE,
E. GAY.ASIATIC SOCIETY'S ROOMS.
Calcutta, 1st Jan., 1875.

Shewing the Assets and Liabilities of the Asiatic Society of Bengal on the 1st Jan. 1876.

We have examined this Statement and see no reason to doubt its correctness.

DAVID WALDIE,
E. GAY.

STATEMENT NO. 5.

Conservation of Sanskrit MSS. in Account Current with the Asiatic Society of Bengal.

Cr.		Dr.	
	1875 0 0		1875 0 0
Balance of 1874,	Ra. 4,832 8 8	Amount spent in 1875,	Ra. 4,937 7 9
Received from the Government of Bengal, the amount sanctioned towards the Conservation of Sanskrit MSS. being 2nd Half of 1874-76,	1,600 0 0	Balance,	4,370 0 11
Ditto ditto being 1st Half of 1875-76, ..	1,600 0 0		9,307 8 8
Sale proceeds of 20 copies Notices of Sanskrit MSS.	20 0 0		
Refund of the amount from Bâba Rajendraâla Mîtra, paid on the 8th October, 1874 for purchase of Sanskrit MSS.	1,200 0 0		
Ditto ditto from Râmdas Chuckerbutty paid for purchase of Sanskrit MSS. ..	35 0 0		
Ditto ditto from the Travelling Pandit paid as an advance on account of his expenses to proceed to Burdwan,	20 0 0		
	4,475 0 0		
	Ra. 9,307 8 8		Ra. 9,307 8 8

We have examined this Statement and see no reason to doubt its correctness.

DAVID WALDIE,
E. GAY.

ASIATIC SOCIETY'S ROOMS,
Calcutta, Jan. 1st, 1876.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of January 1876.

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18 11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches	Inches.	o	o	o	o
1	30.016	30.094	29.957	0.137	67.4	76.5	59.6	16.9
2	.018	.094	.969	.125	66.9	77.3	58.3	19.0
3	.014	.106	.965	.141	67.0	77.5	57.6	19.9
4	29.969	.065	.913	.122	68.7	76.3	63.8	12.5
5	.995	.072	.934	.138	66.1	74.9	59.5	15.4
6	30.018	.095	.962	.133	66.7	76.4	58.1	18.0
7	.017	.103	.955	.118	67.9	76.6	60.0	16.6
8	29.969	.053	.886	.167	68.9	78.4	59.8	18.6
9	30.004	.088	.911	.117	70.2	80.2	61.0	16.2
10	.065	.117	30.014	.133	68.1	78.4	60.0	18.4
11	.062	.114	.005	.139	66.0	76.6	58.5	18.1
12	.028	.114	29.961	.153	64.0	71.4	56.0	18.4
13	.018	.097	.963	.134	63.5	75.5	51.8	20.7
14	.055	.124	.998	.126	64.9	76.7	54.5	22.2
15	.086	.171	30.035	.139	65.5	76.5	56.0	20.5
16	.015	.136	29.974	.162	65.2	76.6	55.8	20.8
17	.009	.090	.947	.143	67.7	79.5	57.0	22.5
18	29.975	.046	.920	.126	70.4	82.0	62.0	20.0
19	.948	.029	.885	.135	71.4	82.0	62.6	19.4
20	.937	.024	.856	.168	71.5	81.0	61.5	16.5
21	.905	.053	.906	.147	69.1	77.8	63.0	14.8
22	.908	29.998	.838	.160	67.3	74.3	57.2	21.1
23	.841	.920	.763	.167	69.9	80.1	62.4	18.0
24	.837	.920	.779	.141	71.3	82.3	62.5	19.8
25	.847	.933	.780	.153	71.1	80.5	61.0	16.5
26	.841	.914	.771	.143	67.1	71.3	62.8	11.5
27	.844	.920	.788	.132	64.7	73.5	56.3	17.2
28	.868	.934	.818	.116	65.9	76.3	57.5	18.8
29	.879	.958	.816	.142	68.5	80.0	58.0	22.0
30	.895	.972	.842	.130	69.3	80.5	60.0	20.5
31	.903	.971	.850	.121	70.2	82.0	59.7	22.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1876.*

Daily Means, &c of the Observations and of the Hygrometrical elements
dependent thereon — (Continued)

Date	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point	Dry Bulb above Dew Point °	Mean Elastic force of vapour	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity. complete satu- ration being unity.
	°	°	°	°	Inches	T gr	T gr	
1	62.0	5.1	57.7	9.7	0.185	5.35	2.04	0.72
2	59.9	7.0	54.3	12.6	.432	4.78	.50	.66
3	60.9	6.1	56.0	11.0	.458	5.07	.23	.70
4	62.1	6.6	56.8	11.9	.470	.18	.51	.67
5	60.0	6.1	55.1	11.0	.411	4.93	.17	.69
6	61.1	5.6	56.6	10.1	.467	5.17	.06	.72
7	62.3	5.6	57.8	10.1	.486	.37	.14	.72
8	63.6	5.3	59.4	6.5	.513	.64	.10	.73
9	64.5	5.7	59.9	10.5	.521	.73	.32	.71
10	61.2	6.9	55.7	12.4	.453	.01	.54	.66
11	58.8	7.2	53.0	13.0	.414	4.59	.49	.65
12	55.8	8.2	48.4	15.6	.351	3.93	.72	.59
13	55.3	8.2	47.9	15.6	.318	.87	.68	.59
14	57.8	7.1	52.1	12.8	.401	4.46	.39	.66
15	58.0	7.5	52.0	13.5	.400	.43	.55	.64
16	58.1	7.1	52.4	12.8	.405	.50	.41	.65
17	62.9	4.8	59.1	8.6	.508	5.61	1.85	.75
18	64.1	6.3	59.1	11.3	.504	.58	2.52	.69
19	63.6	7.8	57.4	14.0	.480	.26	3.09	.63
20	63.2	8.3	56.6	14.9	.467	.12	.26	.61
21	60.3	9.1	53.0	16.4	.414	4.56	.30	.58
22	59.1	8.2	52.5	14.8	.407	.50	2.87	.61
23	62.6	7.3	56.8	13.1	.470	5.17	.81	.65
24	63.4	7.9	57.1	14.2	.475	.21	3.12	.63
25	63.0	8.4	56.3	15.1	.462	.07	.28	.61
26	56.5	10.9	47.8	19.6	.346	3.82	.57	.53
27	55.1	9.6	47.4	17.3	.342	.80	.00	.56
28	58.6	7.3	52.8	13.1	.411	4.56	2.50	.65
29	61.5	7.0	55.9	12.6	.456	5.03	.62	.66
30	60.7	8.6	53.8	15.5	.425	4.68	3.15	.60
31	62.9	7.3	57.1	13.1	.475	5.22	2.83	.65

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon

Hour	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month			Mean Dry Bulb Thermometer	Range of the Tempera- ture for each hour during the month.		
		Max.	Min	Diff		Max	Min	Diff.
	Inches	Inches	Inches	Inches	°	°	°	°
Mid- night	29.972	30.082	29.836	0.246	63.7	68.4	58.2	10.2
1	.964	.071	.832	.239	63.1	68.7	57.3	11.4
2	.955	.069	.822	.217	62.4	68.1	56.5	11.9
3	.945	.061	.810	.251	61.8	67.5	56.0	11.5
4	.941	.058	.802	.256	61.2	67.0	55.5	11.5
5	.952	.071	.816	.255	60.6	66.8	55.2	11.6
6	.966	.064	.833	.231	60.0	66.0	55.0	11.0
7	.988	.101	.858	.243	59.7	65.0	54.5	10.5
8	30.015	.133	.887	.246	61.3	66.7	56.6	10.1
9	.039	.172	.914	.258	65.7	71.0	61.4	9.6
10	.044	.174	.914	.260	69.9	74.0	65.0	9.0
11	.024	.156	.891	.265	73.1	77.0	68.5	8.5
Noon	29.998	.122	.865	.257	75.1	79.0	70.5	8.5
1	.958	.087	.814	.256	76.6	81.0	72.3	8.7
2	.931	.066	.781	.285	77.5	82.0	73.5	8.5
3	.914	.046	.765	.281	78.0	82.3	73.5	8.8
4	.907	.039	.764	.275	76.8	81.0	73.0	8.0
5	.909	.043	.763	.280	75.3	79.6	71.5	8.1
6	.920	.036	.771	.265	71.9	75.5	67.6	7.9
7	.939	.058	.793	.265	69.6	73.3	65.1	8.2
8	.957	.077	.808	.269	68.0	71.5	63.0	8.5
9	.970	.093	.822	.271	66.8	70.4	61.8	8.6
10	.977	.093	.832	.261	65.5	70.0	60.5	9.5
11	.975	.082	.839	.243	64.7	69.0	59.0	10.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon —(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour	Mean Weight of Vapour in a Cubic foot of air	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches	T. gr.	T. gr.	
Mid- night								
1	60.0	3.7	56.7	7.0	.0169	5.22	1.37	.079
2	59.6	3.5	56.1	6.7	.461	.17	.30	.80
3	59.1	3.3	56.1	6.3	.455	.14	.19	.81
4	58.7	3.1	55.9	5.9	.456	.10	.11	.82
5	58.2	3.0	55.5	5.7	.450	.04	.06	.83
6	57.6	3.0	54.9	5.7	.441	4.94	.04	.83
7	57.0	3.0	54.3	5.7	.432	.85	.02	.83
8	56.6	3.1	53.8	5.9	.425	.77	.05	.82
9	57.6	3.7	54.3	7.0	.432	.84	.28	.79
10	59.5	6.2	54.5	11.2	.435	.83	2.19	.69
11	61.4	8.5	54.6	15.3	.437	.81	3.17	.60
12	61.6	11.5	52.4	20.7	.405	.43	4.36	.50
Noon								
1	62.0	13.1	52.8	22.3	.411	.47	.87	.48
2	62.5	14.1	52.6	24.0	.409	.43	5.34	.45
3	62.6	14.9	52.2	25.3	.402	.37	.67	.44
4	62.9	15.1	52.3	25.7	.404	.37	.82	.43
5	62.4	14.4	52.3	24.5	.401	.34	.45	.45
6	63.2	12.1	51.7	20.6	.438	.76	4.64	.51
7	63.7	8.2	57.1	14.8	.475	5.20	3.28	.61
8	63.0	6.6	57.7	11.9	.485	.83	2.57	.68
9	62.4	5.6	57.9	10.1	.489	.38	.15	.71
10	61.7	5.1	57.6	9.2	.483	.34	1.92	.74
11	60.9	4.6	57.2	8.3	.476	.28	.70	.76
12	60.5	4.2	57.1	7.6	.475	.27	.53	.79

All the Hygrometrical elements are computed by the Greenwich Constants.

Meteorological Observations.

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*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Miles.	
1	130.4	...	S S W & S W	...	47.6	B to 4, \i to 7, A. M. B to 11 P. M. Slightly foggy from Midnight to 2 A. M.
2	125.0	...	E N E & N by W [& S by W	...	76.1	B to 7 A. M., \i to 2, B to 11 P. M. Slightly foggy at 8 & 9 P. M.
3	132.0	...	E S E, W by N	...	81.1	B. Slightly foggy at Midnight & 1 A. M.
4	142.5	...	N W & N N W [& S W	...	115.2	\i to 2, O to 5, \i to 7 A. M., B to 2, \i to 4, B to 11 P. M.
5	126.4	...	N N W, N by E	...	128.7	B. Slightly foggy from 7 to 10 P. M.
6	128.0	...	S E, N E & W S W	...	64.3	B to 1, \i to 4, B to 11 P. M. Slightly foggy from 7 to 9 P. M.
7	130.0	...	N E, S W & W N W	...	77.6	B to 5 A. M., \i to 6, B to 11 P. M. Foggy from 7 to 10 P. M.
8	131.0	...	S S E & S S W	...	77.6	B to 12, \i to 1, B to 11 P. M.
9	133.4	...	SSW, N & N N E	...	104.6	B to 2, \i to 6, B to 11 P. M. Foggy from 5 to 8 A. M. & 9 to 11 P. M.
10	135.0	...	N N E & N N W	...	100.8	B to 6 A. M., \i to 6, S to 9, B to 11 P. M. Slightly foggy at Midnight, 1 & 8 A. M. & from 8 to 11 P. M.
11	131.9	...	N N W & W N W	...	95.1	\i to 4, B to 11 P. M. Foggy at Midnight.
12	132.0	...	N by E & W N W	...	107.3	B to 1, \i to 7, B to 11 P. M. Foggy from 8 to 10 P. M.
13	132.0	...	S S W & N by W	...	95.1	B. Slightly foggy from 4 to 8 A. M. & at 8 & 9 P. M.
14	132.0	...	S W, S E & W S W	...	63.4	B.
15	130.0	...	SSW, N & W by S	...	79.1	B. Foggy from 7 to 11 P. M.
16	131.0	...	S W, W & S S W	...	39.8	B. Slightly foggy from Midnight to 4 A. M. & 9 to 11 P. M.
17	136.0	...	S S W & S W	...	45.2	B to 10 A. M., \i to 4, B to 11 P. M. Foggy at Midnight & from 4 to 8 A. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,
\i Cirro,—cumuli-B clear, S straton, O overcast, T thunder, L lightning,
R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1876.*

Solar Radiation. Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles	
18	135.7	...	S W & W	...	87.2	B. Foggy from 3 to 8 A. M.
19	134.0	...	W S W & W	...	100.2	B.
20	136.0	...	S W	...	118.5	B to 3, \i to 6, B to 11 P. M.
21	132.0	...	N N E & W by N	...	121.7	B. Slightly foggy from 8 to 10 P. M.
22	132.0	...	W S W & S S W	...	56.3	B.
23	133.8	...	SSW, WSW & W	...	111.0	B. Foggy from Midnight to 8 A. M.
24	136.0	...	S W, W S W & S by W	...	103.0	B.
25	136.0	...	W & S by W	0.2	118.6	B. Slightly foggy from 1 to 4 A. M.
26	120.0	...	N N E, N W & W N W	...	160.6	B to 5, \i to 7 A. M., Misty to 2, B to 11 P. M.
27	125.0	...	W & W N W	...	153.8	B. Slightly foggy from 8 to 11 P. M.
28	122.5	...	N N W & S S W	...	66.0	B. Slightly foggy at 6 & 7 A. M., & 7 & 8 P. M.
29	134.8	...	S by E & S S W	...	66.2	B to 11, \i to 6, B to 11 P. M.
30	136.0	...	SSW, W S W & W by N	...	51.2	B.
31	137.0	...	S, S W & S S W	...	82.5	B.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,
\i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1876.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.965
Max. height of the Barometer occurred at 10 A. M. on the 15th	30.174
Min. height of the Barometer occurred at 5 P. M. on the 23rd	29.763
Extreme range of the Barometer during the month	0.411
Mean of the daily Max. Pressures	30.044
Ditto ditto Min. ditto	29.904
Mean daily range of the Barometer during the month	0.140

	°
Mean Dry Bulb Thermometer for the month	67.8
Max. Temperature occurred at 3 P. M. on the 24th	82.3
Min. Temperature occurred at 7 A. M. on the 14th	54.5
Extreme range of the Temperature during the month	27.8
Mean of the daily Max. Temperature	78.0
Ditto ditto Min. ditto, °	59.6
Mean daily range of the Temperature during the month	18.4

Mean Wet Bulb Thermometer for the month	60.6
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	7.2
Computed Mean Dew-point for the month	54.8
Mean Dry Bulb Thermometer above computed mean Dew-point	13.0

	Inches.
Mean Elastic force of Vapour for the month	0.440

	Troy grain.
Mean Weight of Vapour for the month	4.85
Additional Weight of Vapour required for complete saturation	2.63
Mean degree of humidity for the month, complete saturation being unity	0.65

	°
Mean Max. Solar radiation Thermometer for the month	131.9

	Inches.
Rained no days,—Max. fall of rain during 24 hours	Nil
Total amount of rain during the month	Nil
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	Nil
Prevailing direction of the Wind ... S. S. W. & S. W.	

* Height 70 feet 10 inches above ground.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1876.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c of the Observations and of the Hygrometrical elements
dependent thereon.

Date	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min	Diff.		Max.	Min.	Diff
	Inches	Inches.	Inches.	Inches.	o	o	o	o
1	29.915	29.992	29.869	0.123	72.8	82.8	66.4	16.4
2	.918	.994	.854	.140	71.2	81.5	67.5	17.0
3	.928	30.008	.880	.128	75.4	84.3	69.9	14.4
4	.968	.063	.914	.119	69.5	77.5	63.5	14.0
5	.991	.081	.921	.163	65.5	75.0	58.4	16.6
6	30.007	.093	.917	.116	61.7	75.0	55.3	19.7
7	29.997	.070	.950	.120	61.2	76.0	51.4	21.6
8	30.044	.110	.989	.121	66.9	79.0	57.0	22.0
9	.060	.143	.996	.147	67.5	79.9	56.5	23.4
10	29.970	.051	.894	.167	68.5	80.8	57.6	23.2
11	.901	29.971	.818	.123	72.4	86.3	60.9	25.6
12	.917	30.008	.894	.111	71.8	84.4	63.5	24.9
13	.966	.012	.913	.129	75.3	86.0	66.2	21.8
14	.902	29.978	.821	.157	75.6	88.5	63.5	25.0
15	.817	.892	.751	.141	77.6	90.0	68.5	21.5
16	.828	.917	.772	.145	78.7	89.2	72.0	17.2
17	.794	.867	.737	.130	77.3	87.5	69.0	18.5
18	.827	.887	.778	.109	75.5	87.0	69.5	17.5
19	.935	30.026	.838	.188	71.8	7.4	66.5	12.9
20	.080	.062	.920	.112	70.2	81.0	62.0	19.0
21	.912	.000	.847	.153	71.2	82.5	62.0	20.5
22	.871	29.951	.804	.147	72.8	83.5	63.0	20.5
23	.789	.870	.710	.160	77.1	86.5	70.5	16.0
24	.772	.842	.707	.135	78.4	87.5	72.5	15.0
25	.878	.963	.821	.142	79.9	82.5	66.5	16.0
26	.941	30.019	.892	.127	73.8	85.0	63.2	21.8
27	.929	29.999	.863	.136	75.7	86.5	68.5	18.0
28	.812	.917	.781	.136	78.0	87.5	71.0	16.5
29	.810	.885	.751	.134	80.2	90.0	74.0	16.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

Meteorological Observations.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February 1876.

Daily Means, &c. of the Observations, and of the Hygrometrical elements dependent thereon. (Continued.)

Date	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point	Dry Bulb above Dew Point.	Mean Electric force of vapour.	Mean Weight of Vapour in a Cubic foot of a f.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°.	°	°	°	Inches	T. gr	T. gr	
1	66.8	60	62.0	10.9	0.559	6.11	2.60	0.70
2	68.8	54	65.0	9.2	.617	7.5	3.4	.74
3	68.5	69	63.7	11.7	.591	4.3	3.0	.68
4	68.6	10.9	49.9	19.6	.372	4.10	.78	.52
5	61.5	11.0	45.7	19.8	.322	3.57	.41	.51
6	61.2	10.8	45.9	18.9	.323	.60	.20	.53
7	64.7	9.5	46.1	18.1	.327	.63	.06	.54
8	67.5	9.3	50.1	16.7	.375	4.11	.12	.57
9	67.8	9.7	50.0	17.5	.373	1.3	.29	.56
10	69.7	8.8	52.7	15.8	.400	5.2	1.3	.59
11	63.1	9.3	55.7	16.7	.453	.98	.61	.58
12	65.1	9.7	58.3	16.5	.494	5.37	.89	.53
13	65.7	9.6	59.0	16.3	.503	.51	.89	.59
14	65.9	9.7	59.1	16.5	.508	5.2	.96	.58
15	66.2	8.1	63.3	11.3	.581	0.33	.74	.68
16	71.2	7.5	65.9	12.8	.636	.88	.53	.66
17	67.9	9.4	61.3	16.0	.516	5.92	4.08	.59
18	70.6	5.0	67.0	8.5	.659	7.17	2.29	.76
19	63.1	8.7	56.1	15.7	.459	5.03	3.42	.80
20	69.7	10.5	61.3	14.9	.390	4.20	.76	.53
21	66.5	10.7	61.9	19.3	.398	.88	.92	.53
22	64.3	8.5	67.5	15.3	.481	5.27	.44	.51
23	71.5	5.6	67.6	9.5	.672	7.29	2.68	.74
24	71.9	6.5	67.3	11.1	.666	.21	3.16	.70
25	66.6	13.3	61.3	22.6	.310	4.25	4.76	.67
26	65.0	8.8	64.8	15.0	.503	5.48	2.50	.61
27	70.1	5.6	66.2	9.5	.612	6.98	2.53	.78
28	73.0	5.0	69.5	8.5	.715	7.74	.45	.76
29	72.4	7.8	66.9	13.3	.657	.90	3.79	.55

All the Hygrometrical elements are computed by the Greenwich Constants.

Meteorological Observations

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February 1876.

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.916	30.086	29.735	0.351	68.5	75.0	59.2	15.8
1	.907	.072	.730	.312	67.9	75.0	59.0	17.0
2	.895	.064	.717	.317	67.3	74.8	57.5	17.3
3	.885	.057	.707	.350	66.8	74.5	56.8	17.7
4	.881	.048	.714	.332	66.3	74.4	56.0	18.4
5	.894	.063	.725	.333	65.8	74.3	55.5	18.3
6	.911	.076	.747	.329	65.1	74.2	55.0	19.2
7	.931	.095	.771	.321	65.2	74.0	54.4	19.6
8	.957	.120	.807	.313	66.8	75.4	57.5	17.9
9	.979	.141	.824	.317	70.8	77.9	63.0	14.9
10	.990	.143	.812	.301	74.5	80.5	68.0	14.5
11	.978	.128	.890	.298	77.0	84.3	69.0	15.3
Noon.	.951	.091	.818	.278	80.1	86.6	70.5	16.1
1	.918	.060	.780	.280	81.9	88.0	73.0	15.0
2	.887	.027	.739	.283	83.1	89.4	74.0	15.4
3	.867	.007	.728	.279	83.8	90.0	75.0	15.0
4	.860	29.998	.713	.283	83.4	90.0	74.4	15.6
5	.860	30.008	.710	.293	81.9	89.0	73.0	16.0
6	.868	.018	.714	.304	78.1	85.4	69.5	15.9
7	.882	.044	.726	.318	74.9	82.0	67.0	15.0
8	.901	.066	.748	.318	72.8	79.5	64.2	15.3
9	.915	.080	.757	.323	71.3	78.5	62.5	16.0
10	.925	.092	.774	.318	70.2	77.0	61.0	16.0
11	.922	.096	.754	.343	69.3	77.3	60.4	16.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon —(Continued)

Hour	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour	Mean Weight of Vapour in a Cubic foot of air	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches	T gr	T gr	
Mid- night								
1	61.6	3.9	61.5	7.0	.550	6.07	1.58	.079
2	64.2	3.7	61.2	6.7	.544	.01	.50	.80
3	63.8	3.5	61.0	6.3	.511	5.99	.38	.81
4	63.4	3.4	60.7	6.1	.536	.93	.33	.82
5	63.0	3.3	60.4	5.9	.530	.88	.27	.82
6	62.6	3.2	60.0	5.8	.523	.80	.24	.82
7	62.2	3.2	59.6	5.8	.516	.73	.22	.82
8	61.8	3.4	59.1	6.1	.508	.64	.27	.82
9	62.5	4.3	59.1	7.7	.508	.62	.64	.77
10	63.8	7.0	58.2	12.6	.498	.41	2.79	.66
11	61.6	9.9	57.7	16.8	.485	.27	3.91	.57
12	65.1	12.8	56.1	21.8	.459	4.97	5.19	.49
Noon								
1	64.9	15.2	54.3	25.8	.432	.66	6.18	.43
2	65.3	16.6	53.7	28.2	.423	.55	.89	.40
3	65.7	17.4	53.5	29.6	.421	.51	7.35	.38
4	65.7	18.1	53.0	30.8	.414	.42	.68	.37
5	65.2	18.2	52.5	30.9	.407	.36	.60	.37
6	65.8	16.1	54.5	27.4	.435	.68	6.78	.41
7	67.1	11.0	59.4	18.7	.513	5.54	4.68	.54
8	66.4	8.5	60.4	14.5	.530	.77	3.51	.62
9	65.7	7.1	60.0	12.8	.523	.72	2.99	.66
10	65.3	6.0	60.5	10.8	.532	.84	.49	.70
11	65.2	5.0	61.2	9.0	.544	.99	.06	.74
12	65.0	4.3	61.6	7.7	.552	6.07	1.76	.78

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1876.*

Solar Radiation, Weather, &c.

Date	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	"	Inches	(by S)	lb	Mile.	
1	136.5	..	S W, S S W & W	..	79.8	B to 4, Scuds to 8, \i to 10 A. M., B to 12, \i to 1, B to 11 P. M. Foggy from Midnight to 4 A. M. at 7, 8 & 11 P. M.
2	138.0	..	S W & S by W	..	95.1	O to 10 A. M., B to 11 P. M. Foggy from Midnight to 4 A. M.
3	135.0	...	S S W & N by E	..	148.6	S to 2, O to 8 A. M., B to 11 P. M. Foggy from 7 to 11 P. M.
4	132.0	...	N N E, N & N W	...	121.8	B.
5	136.0	...	NNW, NW & S W	0.2	166.4	B Slightly foggy at 8 & 9 P. M.
6	132.4	...	SW, NE & W S W	...	105.0	B to 1, \i to 5, B to 11 P. M. Slightly foggy from 8 to 11 P. M.
7	130.4	...	S W & S S W	...	81.3	B. Foggy from Midnight to 6 A. M. & 8 to 10 P. M.
8	132.2	...	S W & Variable	...	84.0	B. Slightly foggy from 9 to 11 P. M.
9	134.2	...	W & S W	...	75.7	B to 4, \i to 6, B to 11 P. M. Slightly foggy from Midnight to 6 A. M. & at 9 & 10 P. M.
10	135.8	...	S W & S by W	...	61.1	B to 11 A. M., \i to 1 P. M. Slightly foggy at 6 & 7 A. M.
11	138.5	..	S by W & S S W	...	108.1	B to 11 A. M., \i to 1, B to 5, \i to 8, B to 11 P. M. Slightly foggy at 1 & 2 & from 5 to 7 A. M.
12	137.8	...	S S W & S W	...	134.7	Chiefly B.
13	138.0	...	S S W & W by S	...	89.7	B. Foggy from 4 to 7 A. M. & at 10 & 11 P. M.
14	137.0	....	S W & S by W [& S W	...	72.0	B to 2, \i & \i to 8 A. M., B to 12, \i to 4, B to 11 P. M.
15	135.5	...	S by W, S S W	...	150.7	B
16	137.5	...	Variable	...	107.0	B to 1, S to 8 A. M., B to 11 P. M.
17	134.0	...	S S W & Variable	...	113.6	B.
18	133.5	1.58	Variable	6.5	94.1	B to 1, \i to 3 A. M., \i to 3, O to 11 P. M. T from 3½ to 6 & at 10 P. M. Lat 5½, 10 & 11 P. M. R from 3½ to 7 & 9½ to 10½ P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,
\i Cirro,—cumuli-B clear, S stratoni, O overcast, T thunder, L lightning,
R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. pressure.	Daily Velocity.	
	^o	Inches		lb	Miles	
19	127.0	1.35	N E, N & N N W	0.2	115.2	O to 9 A. M., \searrow i to 2, B to 11 P. M. Foggy from 8 to 11 P. M. R from 2½ to 3½ A. M.
20	134.8	...	S W & W S W	...	115.6	B. Slightly foggy from 7 to 9 P. M.
21	136.0	...	S W & N W	0.2	109.2	B to 3, \searrow i to 6, B to 11 P. M.
22	134.0	...	S W & S by W	...	118.6	B.
23	133.7	...	S by W & S S W	0.3	160.1	B to 2. O to 10 A. M., \searrow i to 1, \searrow i to 7, S to 11 P. M. Foggy from 3 to 5 A. M. Sheet L on N E at 11½ P. M.
24	136.8	...	S by W & S W	...	231.9	B to 4 A. M., \searrow i to 6, B to 11 P. M.
25	136.0	...	N N W, W & S	0.2	161.2	B to 7, \searrow i to 9 A. M., B to 5, \searrow i to 7, B to 11 P. M.
26	132.6	...	W by S & W	...	98.0	B.
27	135.8	...	S W & S by W	...	68.5	Chiefly B. Foggy from 2 to 8 A. M.
28	138.0	...	S by W, S S W & S	0.2	169.5	Chiefly B.
29	135.2	...	S S W & S W	0.2	238.5	\searrow i to 7 A. M., B to 11 P. M.

\searrow i Cirri, \searrow i Strati, \searrow i Cumuli, \searrow i Cirro-strati, \searrow i Cumulo-strati, \searrow i Nimbi, \searrow i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1876.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29 912
Max. height of the Barometer occurred at 10 A. M. on the 9th	30 143
Min. height of the Barometer occurred at 3 A. M. on the 21st	29 707
Extreme range of the Barometer during the month	0 436
Mean of the daily Max. Pressures	29 990
Ditto ditto Min. ditto	29 850
Mean daily range of the Barometer during the month	0 140

	°
Mean Dry Bulb Thermometer for the month	78.1
Max. Temperature occurred at 3 & 4 P. M. on the 15th & 20th	90 0
Min. Temperature occurred at 7 A. M. on the 7th	54 4
Extreme range of the Temperature during the month	35 6
Mean of the daily Max. Temperature	83 9
Ditto ditto Min. ditto	64 8
Mean daily range of the Temperature during the month	19.1

Mean Wet Bulb Thermometer for the month	64 5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	8 6
Computed Mean Dew-point for the month	57 6
Mean Dry Bulb Thermometer above computed mean Dew-point	15 5

	Inches.
Mean Elastic force of Vapour for the month	0.483

	Troy grain.
Mean Weight of Vapour for the month	5 27
Additional Weight of Vapour required for complete saturation	3 52
Mean degree of humidity for the month, complete saturation being unity	0.60

	°
Mean Max. Solar radiation Thermometer for the month	135.0

	Inches.
Rained 2 days.—Max. fall of rain during 24 hours	1.58
Total amount of rain during the month	2.93
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	2.45
Prevailing direction of the Wind S. W. & S. S. W.	

* Height 70 feet 10 inches above ground.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1876.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18 11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches	Inches	Inches.	Inches	°	°	°	°
1	29.839	29.918	29.731	0.177	78.2	85.2	71.5	13.7
2	.835	.902	.776	.126	76.7	83.2	69.0	14.2
3	.838	.902	.782	.120	72.7	79.7	67.5	12.2
4	.851	.907	.801	.106	76.4	86.0	69.0	17.0
5	.841	.908	.820	.116	75.0	80.5	71.0	12.5
6	.812	.910	.762	.148	78.7	85.5	73.6	11.9
7	.831	.909	.780	.119	79.3	84.6	73.7	12.9
8	.896	.970	.827	.143	77.9	86.0	70.5	15.5
9	.925	30.016	.856	.160	78.2	87.5	71.5	16.0
10	.917	.920	.855	.165	78.3	86.3	73.5	12.8
11	.901	29.965	.819	.116	77.8	87.5	71.5	16.0
12	.929	30.005	.880	.125	77.2	85.0	70.5	15.1
13	.952	.933	.904	.129	79.5	87.6	73.0	14.6
14	.873	29.961	.780	.172	81.2	89.7	74.5	15.2
15	.813	.831	.746	.115	81.3	89.5	74.0	15.5
16	.776	.812	.667	.175	81.2	92.0	73.0	19.0
17	.833	.907	.787	.120	82.8	91.3	77.0	14.3
18	.883	.967	.832	.135	82.2	90.2	75.5	14.7
19	.869	.911	.795	.119	82.5	91.3	75.5	15.8
20	.902	.973	.814	.120	83.0	92.5	75.7	16.8
21	.890	.972	.808	.164	83.3	92.5	76.5	16.0
22	.807	.878	.724	.162	83.9	92.2	77.8	14.4
23	.703	.789	.577	.212	85.1	93.0	79.5	13.5
24	.680	.738	.592	.146	85.5	95.0	79.2	15.8
25	.698	.777	.626	.151	84.2	95.0	75.0	20.0
26	.741	.806	.678	.128	81.3	91.2	77.0	17.2
27	.778	.851	.722	.129	84.3	92.4	80.0	12.4
28	.773	.886	.697	.139	83.5	92.0	77.6	14.4
29	.754	.807	.681	.126	81.9	93.5	78.5	15.0
30	.712	.778	.638	.140	85.5	95.5	76.7	18.8
31	.676	.782	.604	.128	81.9	93.5	78.5	15.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1870.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued)

Date	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches	T. gr.	T. gr.	
1	71.8	3.4	72.1	5.8	0.785	8.50	1.75	0.83
2	73.0	3.7	70.1	6.3	.736	.00	.80	.82
3	69.9	2.8	67.7	5.0	.671	7.39	.29	.85
4	72.0	4.8	68.6	8.2	.695	.55	2.28	.77
5	71.8	4.2	71.9	7.1	.773	6.86	.14	.80
6	75.1	3.6	72.6	6.1	.790	.56	1.85	.82
7	71.8	7.5	66.5	12.8	.618	7.00	3.59	.66
8	68.3	9.6	61.6	16.5	.552	5.97	4.19	.59
9	71.7	6.5	67.1	11.1	.661	7.16	3.09	.70
10	73.3	5.0	69.8	8.5	.722	.81	2.47	.76
11	73.7	4.1	70.8	7.0	.716	6.09	.04	.80
12	72.9	4.3	69.9	7.3	.725	7.87	.08	.79
13	71.5	8.0	65.9	13.6	.636	6.86	3.80	.61
14	75.3	5.9	71.2	10.0	.756	8.13	.08	.73
15	70.8	10.5	63.4	17.9	.596	6.29	4.95	.56
16	76.7	4.5	73.5	7.7	.811	8.70	2.15	.78
17	74.9	7.9	69.1	13.1	.713	7.66	4.09	.65
18	72.4	9.8	65.5	16.7	.628	6.74	.80	.58
19	73.4	9.1	67.0	15.5	.659	7.07	.57	.61
20	71.1	8.9	67.9	15.1	.679	.28	.54	.62
21	77.4	5.9	73.3	10.0	.869	8.06	3.27	.78
22	78.9	5.0	75.4	8.5	.865	9.28	2.87	.75
23	78.7	6.4	74.2	10.9	.812	8.89	3.68	.71
24	71.8	10.7	67.3	18.2	.666	7.10	5.62	.56
25	73.3	10.9	65.7	18.5	.632	6.75	.49	.55
26	77.2	7.1	72.2	12.1	.781	8.34	3.94	.68
27	78.7	5.6	74.8	9.5	.819	9.07	.21	.74
28	78.5	5.0	75.0	8.5	.854	.14	2.86	.76
29	78.6	6.3	74.2	10.7	.832	8.80	3.60	.71
30	76.2	9.3	69.7	16.8	.720	7.68	5.04	.60
31	79.0	5.9	74.9	10.0	.851	9.09	3.40	.73

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night	29.831	29.941	29.670	0.271	77.2	81.3	69.0	12.3
1	.823	.930	.655	.275	76.9	81.0	68.6	12.4
2	.812	.913	.644	.269	76.6	81.0	68.2	12.8
3	.802	.911	.637	.277	76.3	80.5	68.0	12.5
4	.803	.926	.637	.289	75.9	80.5	67.8	12.7
5	.811	.918	.648	.300	75.6	80.0	67.5	12.5
6	.833	.967	.655	.312	75.2	80.0	67.5	12.5
7	.857	.988	.684	.304	75.2	80.0	67.8	12.2
8	.878	80.002	.712	.290	76.7	81.4	68.1	13.0
9	.893	.025	.728	.297	79.7	81.5	71.7	12.8
10	.897	.033	.732	.301	82.4	87.5	73.7	13.8
11	.888	.022	.721	.301	84.7	91.0	76.0	15.0
Noon	.862	29.999	.696	.303	86.6	93.5	78.0	15.5
1	.835	.988	.662	.326	88.0	94.4	78.8	15.6
2	.803	.950	.625	.325	88.8	95.0	79.1	15.9
3	.779	.928	.602	.326	89.3	95.3	79.7	15.6
4	.764	.913	.592	.321	89.0	95.5	79.5	16.0
5	.761	.913	.588	.325	87.9	93.8	78.5	15.3
6	.770	.910	.577	.333	85.3	91.3	73.0	18.3
7	.784	.917	.602	.315	82.5	87.5	74.6	12.9
8	.806	.941	.626	.315	80.7	86.0	73.0	13.0
9	.827	.946	.645	.301	79.5	84.5	71.5	13.0
10	.837	.948	.681	.267	78.3	83.5	70.0	13.5
11	.839	.959	.681	.278	77.6	83.0	69.0	14.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon — (Continued).

Hour	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches	T gr	T gr	
Mid night								
1	71.6	2.6	72.9	4.1	.6795	8.64	1.31	.87
2	71.5	2.4	72.8	4.1	.795	.61	.22	.88
3	74.3	2.3	72.7	3.9	.792	.61	.16	.88
4	74.2	2.1	72.7	3.6	.792	.61	.08	.89
5	74.0	1.9	72.7	3.3	.792	.63	0.94	.90
6	73.9	1.7	72.7	2.9	.792	.63	.55	.91
7	73.4	1.8	72.1	3.1	.778	.48	.89	.91
8	73.2	2.0	71.8	3.4	.771	.49	.97	.90
9	71.0	2.7	72.1	4.6	.773	.41	1.36	.86
10	74.7	5.0	71.2	8.5	.756	.15	2.57	.78
11	74.9	7.5	69.6	12.8	.717	7.69	3.92	.66
12	74.7	10.0	67.7	17.0	.674	.21	6.21	.58
Noon								
1	74.4	12.2	67.1	19.5	.661	.03	6.11	.54
2	74.9	13.1	67.0	21.0	.659	6.99	.69	.51
3	75.3	13.5	67.2	21.6	.661	7.03	.97	.50
4	75.5	13.8	67.2	22.1	.661	.03	7.18	.50
5	75.1	13.9	66.8	22.2	.655	6.94	.14	.49
6	75.5	12.4	69.1	19.8	.681	7.25	6.39	.53
7	75.6	9.7	68.8	16.5	.689	.45	5.19	.59
8	75.0	7.5	69.7	12.8	.720	.72	3.92	.66
9	74.7	6.0	70.5	10.2	.739	.97	.67	.72
10	74.4	5.1	70.8	8.7	.740	8.05	2.61	.76
11	74.3	4.0	71.5	6.8	.763	.26	.02	.80
12	74.4	3.2	72.2	5.4	.781	.46	1.61	.84

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.		General aspect of the Sky.
			Prevailing direction.	Max. Pressure. Daily Velocity.	
1	132.0	1.53	S W & S	8.0 165.3	O to 7 A. M., \wedge i to 6, B to 11 P. M. T, L & R from 5 to 7 A. M., D at 10½ A. M.
2	125.0	0.16	S & S W	2.0 139.1	S to 1, \wedge i to 6, \wedge i to 10 A. M., \wedge i to 3, O to 6, \wedge i to 8, O to 11 P. M. T, L & R after intervals from 8 to 11 P. M.
3	131.0	0.69	S E & S S E	2.2 203.8	O to 5, \wedge i to 8, O to 11 A. M., \wedge i to 5, \wedge i to 8, B to 11 P. M. L from Midnight to 2 A. M. at 7 & 8 P. M. T & R from Midnight to 2 at 10 A. M., 5 & 6 P. M.
4	137.5	...	S & S W [S S W]	... 118.4	B to 9 A. M., \wedge i to 4, \wedge i to 6, B to 11 P. M.
5	141.0	...	S by W, S W & ...	... 101.6	B to 4, S to 8 A. M., \wedge i & \wedge i to 5, B to 11 P. M. Foggy from 5 to 8 A. M.
6	136.4	...	S S W & S	... 98.5	B to 3 A. M., \wedge i & \wedge i to 4, \wedge i to 8, \wedge i to 11 P. M. T & L at 11½ P. M.
7	135.0	0.16	S E & E N E	0.2 110.3	O to 7 A. M., B to 11 P. M. T at Midnight & 1 A. M., L from Midnight to 5 A. M., R at Midnight & 4 A. M.
8	135.0	...	Variable	... 121.5	B.
9	137.5	...	S & W	... 85.8	B to 5, \wedge i to 10 A. M., B to 12, \wedge i to 3, B to 11 P. M.
10	131.0	..	S by W & S S W	... 88.5	B to 5, \wedge i to 11 A. M., \wedge i to 8, B to 11 P. M.
11	141.0	1.06	S by W	1.8 85.7	B to 5, \wedge i to 9 A. M., \wedge i to 4, O to 8, \wedge i to 11 P. M. T, L & R from 5½ to 8 P. M.
12	135.0	0.04	S W & S S W	... 117.0	\wedge i to 6 A. M., \wedge i to 3, \wedge i to 5, B to 8, \wedge i to 11 P. M. Light R at 2 A. M.
13	135.5	...	S S W, N E & S E	... 86.3	B to 4, \wedge i to 6, B to 11 P. M.
14	139.2	..	S W & W S W	... 109.2	B to 5, \wedge i to 11 A. M., \wedge i to 7, B to 11 P. M. Sheet L on S E at 7 P. M.

\wedge i Cirri, — i Strati, \wedge i Cumuli, \wedge i Cirro-strati, \wedge i Cumulo-strati, \wedge i Nimbi, \wedge i Cirro, — cumuli-B clear, S stratoni, O overcast, T thunder, L lightning, R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	^s	^{Inches}		^{lb}	^{Miles}	
15	112.0	...	S W & N N W	105.4	105.4	Scuds to 3, \searrow to 6 A. M., B to 11 P. M.
16	111.4	0.51	S S W	20.0	109.5	S to 1, B to 5, Scuds to 8, B to 11 A. M., \searrow to 8, B to 11 P. M. High wind at 6 P. M. Hails at 5½ P. M. T at 7 & 8 P. M. T & R from 4 to 6 P. M.
17	140.0	...	S by W & S	...	112.1	S to 3, \searrow to 5, \searrow to 8 A. M., B to 11 P. M.
18	138.0	...	S by W	...	86.6	B to 3, \searrow to 6 A. M., \searrow to 7, B to 11 P. M.
19	141.0	...	S W	...	83.9	B to 3, \searrow to 6, B to 11 P. M.
20	141.2	...	S W & S S W	0.2	97.5	B to 7 A. M., \searrow to 7, B to 11 P. M. Slightly foggy at 6 A. M.
21	141.0	...	S W	0.2	130.7	B to 11 A. M., \searrow to 2, \searrow to 7, B to 11 P. M.
22	140.0	...	S W & S	...	137.3	B to 4, \searrow to 6, B to 8, \searrow to 10 A. M., \searrow to 1, \searrow to 6, \searrow to 8, B to 11 P. M. Sheet L on E from 6½ to 8 P. M.
23	142.0	...	S S W & S W	...	129.5	B to 6, \searrow to 8, \searrow to 4, \searrow to 6, B to 11 P. M.
24	143.0	...	S, N W & W by S	...	105.8	Scuds to 3, B to 11 A. M., \searrow to 7, B to 11 P. M. Slightly foggy at 6 & 7 A. M.
25	143.0	...	W S W & S S W	...	108.0	B to 2 A. M., \searrow to 1, B to 11 P. M.
26	142.0	...	S by W & S	...	106.0	B to 3, S to 8 A. M., \searrow to 7, B to 11 P. M.
27	140.0	...	S by W & S	...	169.3	B to 1, S to 7, \searrow to 11 A. M., \searrow to 11 P. M. Sheet L on N E, from 6½ to 8 P. M.
28	140.8	...	S by W & S	0.8	161.9	\searrow to 10 A. M., \searrow to 2, S to 6, \searrow to 9, B to 11 P. M. T at 5 P. M. Sheet L from 7 to 11 P. M. D at 5½ P. M.

\searrow i Cirri, — i Strati, \searrow i Cumuli, \searrow i Cirro-strati, \sim i Cumulo-strati, \searrow i Nimbi, \searrow i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1876.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches.		lb	Miles.	
29	144.0	0.01	S & S S W	..	167.8	O to 1, B to 6 A. M., ~i to 12, i to 4, i to 7, B to 11 P. M. T at 1½ A. M. Sheet I. from 2 to 1 A. M. Light R at 1½ A. M.
30	141.0	0.17.	S S W & S	1.2	170.0	~i to 5, ~i to 10 A. M., B to 3, ~i to 8, O to 11 P. M. I. from 7 to 11 P. M. T between 8 & 9 P. M. R at 9½ P. M.
31	141.0	...	Shy E, S & S S W	..	141.5	~i to 5 A. M., ~i to 4, B to 11 P. M.

~i Cirri — i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati ~i Nimb,
~i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning
R rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1876.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29 825
Max. height of the Barometer occurred at 10 A. M. on the 18th .	30 093
Min. height of the Barometer occurred at 6 P. M. on the 23rd .	29 577
Extreme range of the Barometer during the month	0 456
Mean of the daily Max. Pressures	29 899
Ditto ditto Min. ditto	29 756
Mean daily range of the Barometer during the month	0 143

	°
Mean Dry Bulb Thermometer for the month	81 1
Max. Temperature occurred at 4 P. M. on the 30th .	95 5
Min. Temperature occurred at 5 & 6 A. M. on the 3rd .	67 5
Extreme range of the Temperature during the month	28 0
Mean of the daily Max. Temperature	89 6
Ditto ditto Min. ditto,	74 5
Mean daily range of the Temperature during the month	15 1

Mean Wet Bulb Thermometer for the month	74 6
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	6 5
Computed Mean Dew-point for the month	70 0
Mean Dry Bulb Thermometer above computed mean Dew point	11 1

	Inches.
Mean Elastic force of Vapour for the month	0 727

	Troy grain.
Mean Weight of Vapour for the month	7 82
Additional Weight of Vapour required for complete saturation	8 85
Mean degree of humidity for the month, complete saturation being unity	0 70

	°
Mean Max. Solar radiation Thermometer for the month	138 6

	Inches.
Rained 10 days.—Max. fall of rain during 24 hours	1 53
Total amount of rain during the month	4 36
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	3 74
Prevailing direction of the Wind ... S. S. W. & S. W.	

* Height 70 feet 10 inches above ground.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1876.*

Latitude 22° 33' 1" North. Longitude 88° 20' 31" East.

Height of the Cistern of the Standard Barometer above the sea level, 18 11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.705	29.769	29.638	0.131	85.1	94.1	78.5	15.9
2	.761	.832	.698	.131	84.2	93.5	79.2	14.3
3	.834	.921	.769	.152	84.8	93.2	77.5	15.7
4	.799	.877	.725	.152	85.3	93.4	79.5	13.9
5	.779	.841	.723	.121	85.3	93.7	79.5	14.2
6	.797	.866	.727	.139	86.1	91.7	79.0	15.7
7	.803	.871	.729	.145	85.8	96.0	78.5	17.5
8	.770	.853	.696	.157	86.1	97.8	78.3	19.5
9	.710	.787	.619	.168	87.2	99.5	79.5	20.0
10	.681	.759	.601	.155	87.2	97.8	81.2	16.6
11	.684	.747	.605	.152	86.1	94.6	80.0	14.6
12	.706	.786	.611	.172	83.6	91.8	71.0	17.8
13	.708	.749	.611	.105	86.5	91.2	73.5	17.7
14	.674	.733	.611	.122	85.8	93.1	80.5	12.9
15	.673	.710	.608	.132	86.6	94.5	80.0	14.5
16	.718	.781	.662	.122	84.0	96.0	82.5	13.5
17	.671	.750	.576	.174	87.2	97.5	80.4	17.1
18	.612	.675	.538	.137	86.6	91.0	80.0	14.0
19	.708	.778	.639	.139	86.8	94.5	80.6	13.9
20	.731	.805	.651	.154	86.3	94.4	80.0	14.4
21	.707	.780	.639	.141	86.4	96.3	79.0	17.3
22	.645	.700	.548	.161	87.0	96.3	79.7	16.6
23	.610	.682	.556	.126	87.5	95.1	82.0	13.1
24	.638	.692	.586	.106	87.5	95.6	82.0	13.6
25	.681	.755	.627	.128	87.0	94.0	81.5	12.5
26	.666	.726	.589	.137	88.0	96.5	82.0	14.5
27	.664	.733	.612	.121	87.6	96.1	81.3	15.1
28	.720	.793	.661	.129	87.1	96.0	81.5	14.5
29	.764	.812	.708	.131	86.6	94.5	80.0	14.5
30	.747	.824	.669	.155	85.9	94.8	77.8	17.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1876.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	79.0	6.1	74.7	10.4	.8416	9.05	3.52	.072
2	79.5	4.7	76.2	8.0	.887	.51	2.73	.78
3	76.8	8.0	71.2	13.6	.756	8.07	4.39	.65
4	74.9	10.4	67.6	17.7	.672	7.17	5.47	.57
5	76.9	8.4	71.0	14.3	.751	8.02	4.62	.63
6	76.9	9.2	70.5	15.6	.739	7.87	5.08	.61
7	75.6	10.2	68.5	17.3	.692	.39	.41	.58
8	77.5	8.6	71.5	14.6	.763	8.13	4.82	.63
9	79.3	7.9	71.6	12.6	.813	.96	.41	.67
10	79.7	7.5	75.2	12.0	.860	9.15	.22	.68
11	79.8	6.3	75.4	10.7	.865	.22	3.73	.71
12	77.4	6.2	73.1	10.5	.803	8.60	.43	.72
13	75.8	4.7	72.5	8.0	.787	.49	2.19	.77
14	78.6	7.2	73.6	12.2	.817	.72	4.11	.68
15	80.9	5.7	77.5	9.1	.925	9.86	3.28	.75
16	77.2	10.8	70.7	17.3	.744	7.90	5.78	.58
17	79.6	7.6	75.0	12.2	.851	9.09	4.28	.68
18	80.0	6.6	76.0	10.6	.882	.39	3.75	.72
19	79.6	7.2	75.3	11.5	.862	.17	4.01	.69
20	78.8	7.5	73.5	12.8	.814	8.67	.35	.67
21	78.7	7.7	73.3	13.1	.809	.61	.45	.66
22	80.2	6.8	76.1	10.9	.885	9.42	3.87	.71
23	80.5	7.0	76.3	11.2	.890	.48	4.01	.70
24	81.2	6.3	77.4	10.1	.922	.81	3.68	.73
25	80.6	6.4	76.8	10.2	.905	.63	.66	.73
26	81.0	7.0	76.8	11.2	.905	.61	4.07	.70
27	80.6	7.0	76.4	11.2	.893	.51	.01	.70
28	80.4	7.0	76.2	11.2	.887	.45	.00	.70
29	79.1	7.5	74.6	12.0	.813	8.98	.16	.68
30	78.2	7.7	72.8	13.1	.795	.48	.39	.66

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.720	29.819	29.609	0.210	82.0	84.0	74.5	9.5
1	.710	.810	.601	.209	81.6	83.8	74.1	9.7
2	.700	.806	.590	.210	81.2	83.6	73.9	9.7
3	.691	.805	.574	.231	80.8	83.5	73.7	9.8
4	.690	.811	.572	.239	80.5	83.2	73.7	9.5
5	.706	.830	.585	.245	80.0	83.0	73.5	9.5
6	.724	.845	.608	.237	79.8	82.5	73.5	9.0
7	.746	.872	.641	.231	80.7	81.0	74.8	9.2
8	.766	.900	.656	.244	83.2	86.0	79.5	6.5
9	.778	.919	.671	.248	86.1	88.5	82.8	5.7
10	.778	.921	.661	.260	88.9	91.6	85.5	6.1
11	.767	.907	.647	.260	91.1	94.0	87.4	6.6
•								
Noon.	.748	.881	.626	.258	92.7	96.0	87.3	8.7
1	.723	.860	.602	.258	93.9	98.0	90.5	7.5
2	.691	.827	.573	.254	94.6	99.5	89.0	10.5
3	.671	.793	.563	.230	94.6	98.5	86.0	12.5
4	.653	.780	.514	.236	93.0	97.8	79.0	18.8
5	.645	.769	.538	.231	92.3	96.0	77.7	18.3
6	.652	.771	.548	.223	90.0	92.5	81.4	11.1
7	.673	.788	.573	.215	86.6	89.0	81.8	7.2
8	.694	.816	.580	.236	84.9	86.7	82.0	4.7
9	.716	.829	.599	.230	83.8	85.5	82.0	3.5
10	.728	.814	.616	.228	82.9	85.0	77.5	7.5
11	.727	.829	.613	.216	82.2	84.5	74.0	10.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon — (Continued)

Hour	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air	Additional Weight of Vapour* required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches	T gr	T gr	
Mid- night	79.7	3.3	76.4	5.6	0.893	9.60	1.87	0.84
1	78.5	3.1	76.3	5.3	.890	.59	.75	.85
2	78.2	3.0	76.1	5.1	.885	.53	.64	.85
3	78.0	2.8	76.0	4.8	.882	.50	.57	.86
4	77.8	2.7	75.9	4.6	.879	.47	.51	.86
5	77.6	2.1	75.9	4.1	.879	.49	.32	.88
6	77.5	2.3	75.9	3.9	.879	.49	.26	.88
7	78.1	2.6	76.3	4.4	.890	.61	.43	.87
8	79.0	4.2	76.1	7.1	.885	.50	2.39	.80
9	79.7	6.4	75.2	10.9	.860	.16	3.79	.71
10	79.7	9.2	74.2	14.7	.832	8.82	5.22	.63
11	79.5	11.6	72.5	18.6	.787	.30	6.67	.56
Noon	79.5	13.2	71.6	21.1	.766	.05	7.58	.51
1	79.5	11.1	70.9	23.0	.718	7.85	8.37	.48
2	79.3	15.3	70.1	21.5	.729	.61	.91	.46
3	79.2	15.4	70.0	21.6	.727	.61	.91	.46
4	78.7	15.2	69.6	21.3	.717	.52	.70	.46
5	79.3	13.0	71.5	20.8	.763	8.03	7.47	.52
6	79.6	10.4	73.4	16.6	.811	.57	5.93	.59
7	78.8	7.8	74.1	12.5	.830	.83	4.31	.67
8	78.6	6.3	74.2	10.7	.832	.89	3.60	.71
9	79.0	4.8	75.6	8.2	.871	9.33	2.77	.77
10	78.9	4.0	76.1	6.8	.885	.50	.29	.81
11	78.7	3.5	76.2	6.0	.887	.54	.00	.83

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.		General aspect of the Sky.
			Prevailing direction.	Max. Pressure Daily Velocity.	
	^o	Inches		lb Miles.	
1	143.2	...	S	... 138.5	☁ to 1, B to 10 A. M., ☁ to 4, S to 11 P. M. L from 5½ to 8 P. M. T & D between 5 & 6 P. M.
2	141.0	0.13	S & S S W	1.0 151.0	S to 6 A. M., ☁ to 5, ☁ & ☁ to 8, B to 11 P. M. L from 6½ to 8 P. M. T & R between 4 & 5 P. M.
3	139.7	...	S S W	... 115.3	☁ to 1, B to 6, ☁ to 8 A. M., B to 1, ☁ to 3, ☁ to 6, B to 11 P. M.
4	141.0	...	S W & Variable	... 123.6	B to 5, ☁ to 9 A. M., B to 11 P. M.
5	139.0	...	S S W, W by S & S	... 80.8	B to 1, Seeds to 6 A. M., B to 9, ☁ to 11 P. M.
6	141.5	...	S S W	... 110.0	B.
7	141.0	...	Variable	... 75.7	B.
8	144.0	...	S S W & S W	... 105.3	B.
9	147.0	...	S W & S	0.8 225.8	Seeds to 4 A. M., B to 8, ☁ to 11 P. M.
10	144.0	...	S S W & S	... 219.2	☁ to 4, ☁ to 6 A. M., B to 11 P. M.
11	143.8	...	S S W & S	... 193.2	Seeds to 4, ☁ to 7, ☁ to 10 A. M., ☁ to 3, ☁ to 11 P. M. Sheet L from 7 to 9 P. M.
12	136.7	0.04	S	2.0 263.4	B to 4, ☁ to 8 A. M., ☁ to 5, O to 11 P. M. T at 9½ P. M. L from 8 to 10 P. M. Light R between 9 & 10 P. M.
13	141.0	0.03	S S E & S	2.0 305.7	☁ to 2 A. M., ☁ to 1, O to 11 P. M. T from 2 to 5 P. M. L from 3½ to 9 P. M. Light R between 3 & 4 P. M.
14	140.0	...	S by W & N	0.1 157.1	Seeds to 1, ☁ to 8, A. M. ☁ to 12, B to 11 P. M.
15	144.2	...	S by W & S S W	... 158.1	B to 5 A. M., ☁ to 11 P. M. T at 7 P. M. L at 7 & 8 P. M.

☁ Cirri, —i Strati, ☁ Cumuli, ☁ Cirro-strati, ☁ Cumulo-strati, ☁ Nimbi,
☁ Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning,
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Miles.	
16	144.0	...	S S W & Variable	...	151.1	O to 4, ci to 9 A. M., B to 11 P. M.
17	145.0	...	S S W & S W	...	133.3	B to 11 A. M., ci to 5, B to 9, Scuds to 11 P. M.
18	143.0	...	S S W	2.1	250.6	Scuds to 7 A. M., B to 5, ci to 7, Scuds to 11 P. M. Sheet L from 7 to 10 P. M.
19	143.0	...	S & S W	0.8	262.8	ci to 2, B to 7 A. M., ci to 4, ci to 6, B to 11 P. M.
20	143.0	...	S & S W	1.0	360.3	B to 3, S to 8, B to 11 P. M. Sheet L on N at 7 P. M. D at 6½ P. M.
21	143.0	...	S, S S W & S W	0.8	153.4	B to 3, ci & ci to 11 P. M.
22	145.0	...	S by W & S S W	0.8	222.0	B to 6, ci to 10 A. M., B to 2, ci to 4, ci to 8, O to 11 P. M. Sheet L on N at 8 P. M.
23	142.5	...	S S W & S W	1.2	320.7	S to 3, ci to 7, Scuds to 10 A. M., B to 11 P. M.
24	143.0	...	S S W & S W	1.2	358.2	B to 4, Scuds to 11 A. M., B to 9, Scuds to 11 P. M.
25	142.0	...	S S W	1.9	311.4	Scuds to 10 A. M., ci to 2, B to 9, S to 11 P. M.
26	145.5	...	S S W	0.6	288.8	S to 1, B to 4, Scuds to 10 A. M., ci to 2, B to 8, Scuds to 11 P. M.
27	147.0	...	S S W	0.4	295.9	Chiefly B.
28	146.0	...	S W & S S W	1.2	211.9	Chiefly B.
29	144.5	...	S S W	1.6	289.3	B.
30	144.5	...	S S W & S W	1.8	255.7	B.

ci Cirri,—i Strati, ci Cumuli, ci Cirro-strati, ci Cumulo-strati, ci Nimbi,
ci Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1870.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.712
Max. height of the Barometer occurred at 10 A. M. on the 3rd ..	29.921
Min. height of the Barometer occurred at 5 P. M. on the 18th ..	29.638
Extreme range of the Barometer during the month	0.383
Mean of the daily Max. Pressures	29.782
Ditto ditto Min. ditto	29.642
Mean daily range of the Barometer during the month	0.140

	°
Mean Dry Bulb Thermometer for the month	86.2
Max. Temperature occurred at 2 P. M. on the 9th	99.5
Min. Temperature occurred at 5 & 6 A. M. on the 13th	73.5
Extreme range of the Temperature during the month	26.0
Mean of the daily Max. Temperature	95.0
Ditto ditto Min. ditto,	79.6
Mean daily range of the Temperature during the month	15.4

Mean Wet Bulb Thermometer for the month	78.8
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	7.4
Computed Mean Dew-point for the month	73.6
Mean Dry Bulb Thermometer above computed mean Dew-point	12.6

	Inches.
Mean Elastic force of Vapour for the month	0.817

	Troy grain.
Mean Weight of Vapour for the month	8.70
Additional Weight of Vapour required for complete saturation	4.29
Mean degree of humidity for the month, complete saturation being unity	0.67

	°
Mean Max. Solar radiation Thermometer for the month	143.0

	Inches.
Rained 5 days.—Max. fall of rain during 24 hours	0.19
Total amount of rain during the month	0.20
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	0.14
Prevailing direction of the Wind S. S. W., S. & S. W.	

* Height 70 feet 10 inches above ground.

Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of April 1876.

MONTHLY RESULTS

Tables shewing the number of days on which at a given hour any particular wind blew together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1876.*

Latitude 22° 33' 1" North. Longitude 85° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18 11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date	Mean Height of the Barometer at 32° Falit. Inches	Range of the Barometer during the day.			Mean Dry Bulb Thermometer. °	Range of the Tempera- ture during the day.		
		Max.	Min	Diff.		Max	Min.	Diff
		Inches	Inches	Inches		°	°	°
1	29.669	29.711	29.578	0.133	86.9	97.0	80.1	16.6
2	.607	.663	.526	.137	87.1	91.1	82.0	12.1
3	.659	.705	.596	.109	88.9	96.9	81.7	13.2
4	.618	.696	.563	.133	85.6	90.5	82.3	7.2
5	.628	.707	.564	.143	87.3	91.3	82.0	12.3
6	.591	.673	.511	.162	85.2	96.0	82.9	13.1
7	.604	.661	.549	.115	88.2	96.0	82.1	13.6
8	.636	.690	.565	.125	89.1	96.5	83.0	13.5
9	.670	.727	.602	.125	89.1	96.6	81.2	12.4
10	.663	.710	.587	.123	89.1	96.9	82.5	11.4
11	.641	.726	.563	.163	88.9	98.5	81.9	16.6
12	.613	.701	.525	.176	88.9	97.5	82.6	11.9
13	.660	.713	.588	.125	86.9	96.7	79.5	17.2
14	.680	.758	.585	.173	87.2	97.5	76.5	21.0
15	.629	.698	.527	.171	81.1	91.9	75.5	19.4
16	.614	.676	.551	.125	83.1	91.5	77.0	17.5
17	.681	.752	.598	.159	81.5	91.5	76.5	16.0
18	.721	.809	.652	.148	85.1	91.4	76.7	17.7
19	.690	.763	.612	.151	87.9	91.8	82.5	12.3
20	.678	.742	.621	.121	84.1	88.0	81.0	7.0
21	.723	.786	.661	.125	88.8	98.5	80.1	18.1
22	.733	.795	.661	.134	88.3	96.0	82.5	13.5
23	.683	.749	.602	.147	84.1	95.1	82.5	12.9
24	.659	.726	.611	.115	83.8	92.0	78.0	11.0
25	.675	.739	.612	.127	81.7	92.7	78.0	11.7
26	.688	.731	.615	.086	83.3	91.6	78.0	13.6
27	.683	.726	.612	.111	82.4	90.6	77.0	13.6
28	.649	.698	.568	.130	83.6	91.4	78.5	12.9
29	.598	.647	.520	.127	85.3	91.0	79.8	14.2
30	.587	.641	.509	.132	87.1	95.8	80.0	15.8
31	.593	.612	.517	.125	87.3	96.8	82.3	11.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surgeon General's Office, Calcutta,
in the month of May 1876.*

Daily Means, &c of the Observations and of the Hygrometrical elements
dependent thereon — (Continued)

Date	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet	Computed Dew Point.	Dry Bulb above Dew Point	Mean Elastic force of vapour:	Mean Weight of Vapour in a Cubic foot of air	Additional Weight of Vapour required for complete saturation	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches	T gr	T gr	
1	79.1	7.8	71.1	12.5	.0838	8.91	1.31	.67
2	80.9	6.5	77.0	10.1	.0910	9.69	3.76	.72
3	81.1	7.8	76.1	12.5	.093	17	1.57	.68
4	79.1	6.2	75.1	10.5	.087	13	3.63	.72
5	79.8	7.5	75.3	12.0	.092	17	4.24	.68
6	81.0	7.2	76.7	11.5	.092	56	20	.70
7	81.2	7.0	77.0	11.2	.0910	67	09	.70
8	81.1	7.7	76.8	12.3	.0905	59	53	.68
9	81.5	7.6	76.9	12.2	.098	62	50	.68
10	81.3	7.4	76.6	12.5	.099	52	60	.67
11	81.0	7.9	76.3	12.6	.090	41	60	.67
12	80.1	8.5	75.3	13.6	.092	11	90	.65
13	79.6	7.3	75.2	11.7	.090	15	10	.69
14	80.5	6.7	76.5	10.7	.096	51	3.83	.71
15	78.1	6.0	73.9	10.2	.0821	8.83	38	.72
16	78.6	1.5	75.1	7.7	.085	9.28	2.58	.74
17	79.5	5.0	76.0	8.5	.082	.43	92	.76
18	80.0	5.1	76.1	8.7	.083	55	3.02	.76
19	82.3	5.6	78.9	9.0	.097	10.28	36	.75
20	79.9	4.2	77.0	7.1	.0910	9.75	2.46	.80
21	79.5	9.3	73.9	11.9	.0821	8.74	5.26	.62
22	82.1	6.2	78.1	9.9	.0932	10.10	3.70	.73
23	82.7	5.4	79.5	8.6	.086	.47	.25	.76
24	80.2	3.6	77.7	6.1	.0931	9.98	2.12	.83
25	79.7	5.0	76.2	8.5	.087	.49	.93	.76
26	79.2	4.1	76.3	7.0	.090	.55	.38	.80
27	78.1	4.3	75.1	7.3	.087	.21	.40	.79
28	79.5	4.1	76.0	7.0	.099	.63	.40	.80
29	80.7	4.0	77.5	7.8	.095	.88	.76	.78
30	82.0	5.1	78.9	8.2	.097	10.80	3.03	.77
31	82.2	5.1	79.1	8.2	.093	.86	.05	.77

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.662	29.757	29.569	0.188	82.5	85.8	76.7	9.1
1	.654	.717	.579	.168	82.2	85.5	77.0	8.5
2	.616	.730	.574	.165	82.0	85.2	77.0	8.2
3	.639	.732	.563	.169	81.7	85.0	77.0	8.0
4	.638	.722	.572	.150	81.1	84.8	77.0	7.8
5	.652	.739	.586	.153	81.2	84.5	77.0	7.5
6	.666	.715	.602	.113	81.3	84.5	76.6	7.9
7	.688	.772	.626	.146	82.6	85.5	77.6	7.9
8	.703	.782	.640	.142	85.0	88.5	79.8	8.7
9	.709	.800	.641	.159	87.7	91.0	82.0	9.0
10	.707	.797	.645	.162	89.9	93.4	83.0	10.4
11	.693	.790	.626	.164	91.6	95.7	84.4	11.3
Noon	.680	.782	.598	.184	92.8	97.2	85.5	11.7
1	.659	.765	.579	.186	93.6	98.0	83.0	15.0
2	.692	.729	.551	.178	91.1	98.5	86.6	11.9
3	.610	.700	.524	.176	91.0	98.5	81.0	11.5
4	.591	.676	.513	.163	92.9	98.5	78.8	19.7
5	.584	.670	.509	.161	91.1	98.2	78.0	20.2
6	.601	.675	.511	.161	88.6	95.5	78.5	17.0
7	.622	.716	.529	.187	85.9	91.3	76.5	14.8
8	.642	.755	.538	.217	84.8	88.1	76.5	11.9
9	.661	.752	.572	.180	83.9	87.0	76.0	11.0
10	.673	.763	.601	.162	83.3	86.0	75.5	10.5
11	.668	.762	.592	.170	82.9	85.8	76.5	9.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night	79.0	3.5	76.5	6.0	.0896	9.63	2.01	0.83
1	79.0	3.2	76.8	5.4	.0905	.73	1.91	.84
2	79.0	3.0	76.9	5.1	.0908	.76	.71	.85
3	78.9	2.8	76.9	4.8	.0908	.76	.61	.86
4	78.8	2.6	77.0	4.4	.0910	.81	.46	.87
5	78.8	2.4	77.1	4.1	.0913	.84	.37	.88
6	79.0	2.3	77.4	3.9	.0922	.93	.31	.88
7	79.8	2.8	77.8	4.8	.0934	10.03	.65	.86
8	80.7	4.3	77.7	7.3	.0931	9.96	2.57	.80
9	81.2	6.5	77.3	10.4	.0919	.78	3.78	.72
10	81.8	8.1	76.9	13.0	.0908	.60	4.80	.60
11	82.4	9.2	76.9	14.7	.0908	.56	5.53	.63
Noon.	82.7	10.1	76.6	16.2	.899	.46	6.26	.60
1	72.7	10.9	76.2	17.4	.887	.33	.75	.58
2	82.7	11.4	75.9	18.2	.879	.23	7.09	.57
3	82.6	11.4	75.8	18.2	.870	.20	.07	.57
4	82.4	10.5	76.1	16.8	.885	.30	6.47	.59
5	81.5	9.6	75.7	15.4	.873	.22	5.75	.62
6	80.2	8.4	75.2	13.4	.860	.13	4.79	.64
7	79.4	6.5	74.8	11.1	.869	.06	3.81	.76
8	79.4	5.4	75.6	9.2	.871	.31	.15	.75
9	79.2	4.7	75.9	8.0	.879	.43	2.71	.79
10	79.3	4.0	76.5	6.8	.896	.61	.33	.81
11	79.1	3.8	76.4	6.5	.893	.58	.31	.81

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Miles.	
1	144.0	...	S S W & S	1.8	337.8	B.
2	141.0	...	S S W & S S E	3.9	426.2	B to 5, ½ to 11 A. M., Scuds to 3, ½ to 11 P. M.
3	145.0	...	S & S S W	2.0	399.6	½ to 8, B to 11 A. M., ½ to 11 P. M.
4	110.0	0.12	S S W	7.3	396.7	½ to 6 A. M., O to 12, ½ to 5, S to 9, O to 11 P. M., T at 11 A. M. Sheet L on N W from 7 to 9 P. M. Slight R at 11, 12 & 1 P. M.
5	142.4	0.08	S & S S E	5.2	382.8	O to 5 A. M., ½ to 12, ½ to 2, ½ to 9, ½ to 11 P. M. T, L & R at 3 & 4 A. M.
6	148.0	...	S & S S E	1.0	219.9	½ to 6 A. M., ½ to 11 P. M.
7	143.0	...	S S E & S	1.2	440.0	Scuds to 3, ½ to 7, Scuds to 10 A. M., ½ to 5, ½ to 9, Scuds to 11 P. M.
8	147.0	...	S S E & S S W	1.0	294.1	Clouds of different kinds. Sheet L on N E at 7 & 8 P. M.
9	142.0	...	S, E & S S W	...	257.6	S to 5 A. M., ½ to 4, ½ to 9, S to 11 P. M. L on N at 7 P. M.
10	142.5	...	S by E & S	0.7	230.3	S to 4, ½ to 10 A. M., ½ to 4, ½ to 11 P. M. Sheet L on N E from 7 to 9 P. M.
11	149.0	...	S & S S W	0.8	219.6	½ to 7, ½ to 10 A. M., ½ to 5, S to 9, ½ to 11 P. M.
12	148.0	...	S S W & S	4.2	276.9	B to 1, ½ to 11 A. M., B to 1, ½ to 3, B to 6, O to 11 P. M. T at 7 P. M. L from 6½ to 10 P. M.
13	144.5	...	S S E & S S W	3.2	326.0	½ to 7 A. M., ½ to 5, S to 11 P. M.
14	147.0	0.38	S & S W	5.0	214.4	B to 6 A. M., ½ to 5, O to 11 P. M., T, L & R from 6 to 10½ P. M.

½ Cirri, — Strati, ½ Cumuli, ½ Cirro-strati, ½ Cumulo-strati, ½ Nimbi, ½ Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.		General aspect of the Sky.
			Prevailing direction.	Max. Pressure Daily Velocity.	
	°	Inches		fb Miles.	
15	143.0	1.05	S S W & Variable	9.8	206.6 O to 3, S to 5, \searrow to 10 A. M., \swarrow to 8, O to 11 P. M. T & L from 7 to 10 P. M. R from 9 to 11 P. M.
16	141.0	0.17	Variable	0.5	230.8 O to 6, \searrow to 11 A. M., \swarrow to 3, O to 11 P. M. T at 1 & 2 A. M. L from Midnight to 3 A. M. & at 7 & 8 P. M. R at 2 A. M. & between 6 & 7 P. M.
17	138.3	0.50	S S W & S	4.1	206.9 S to 5 A. M., \searrow & \swarrow to 6, O to 11 P. M. T, L & R from 6½ to 9 P. M.
18	143.0	...	S S W & S	...	184.1 O to 2, \searrow to 10 A. M., \swarrow to 4, \searrow to 7, B to 11 P. M. Sheet L on N from 8 to 10 P. M.
19	142.2	...	S S E & S S W	...	211.8 B to 7 A. M., \swarrow to 3, B to 7, S to 11 P. M. Sheet L on W at 8 & 9 P. M.
20	124.0	0.05	S E & S	...	244.4 \searrow to 7, O to 11 A. M., S to 11 P. M. L on E at 4 A. M. Light R at 2½ & 3½ A. M.
21	146.0	...	S & S W	...	169.4 Chiefly B.
22	144.0	...	S & S S W	...	176.7 \searrow to 7, \swarrow to 10 A. M., \searrow to 1, \swarrow to 7, B to 11 P. M.
23	144.5	...	S & S S W	1.4	275.5 Clouds of different kinds. Sheet L on N at 7 P. M.
24	131.5	0.13	S & E by S	0.5	295.0 Scuds to 7 A. M., \swarrow to 12, O to 11 P. M. T from 12 to 4 & at 6½ P. M. L from 3½ to 10 P. M. Slight R at 12, 1, 3 & 4 P. M.
25	138.8	...	E by S & Variable	...	110.1 O to 8 A. M., \searrow to 6, S to 11 P. M. Sheet L from 8 to 11 P. M.
26	141.0	0.33	S S E & E	1.9	110.2 S to 3, \searrow to 9 A. M., \swarrow to 4, \searrow to 9, O to 11 P. M. T at 3 P. M. L on S at 10 & 11 P. M. R at 1½ & 3 P. M.

\searrow Cirri, \swarrow Strati, \swarrow Cumuli, \searrow Cirro-strati, \swarrow Cumulo-strati, \searrow Nimbi,
 \searrow Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1876.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches.		lb	Miles.	
27	141.0	...	E N E & S E	...	174.0	O to 3, \searrow i to 8 A. M., \nearrow i to 11 P. M.
28	112.5	...	S E, E & S	...	133.7	S to 6, O to 9 A. M., \nearrow i to 6, \searrow i to 9, B to 11 P. M. T at 9½, 10 A. M. & 1 P. M.
29	147.2	0.06	E S E & S E	...	102.5	B to 7 A. M., \nearrow i to 7, B to 11 P. M. T & R between 5 & 6 P. M.
30	148.0	...	S & S E	...	88.1	B to 4 A. M., \nearrow i to 5, \searrow i to 8, B to 11 P. M.
31	152.0	...	S & S by W	1.3	102.1	B to 4, \searrow i to 7 A. M., \nearrow i to 8, B to 11 P. M. T at 4 P. M.

\searrow i Cirri — i Strati, \nearrow i Cumuli, \searrow i Cirro-strati, \sim i Cumulo-strati, \searrow i Nimbi,
 \searrow i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightain.,
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1876.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29 858
Max. height of the Barometer occurred at 9 A. M. on the 18th ..	29 800
Min. height of the Barometer occurred at 5 P. M. on the 30th ...	29 509
Extreme range of the Barometer during the month	0.291
Mean of the daily Max. Pressures	29 710
Ditto ditto Min. ditto	29 580
Mean daily range of the Barometer during the month	0.136

	°
Mean Dry Bulb Thermometer for the month	86 5
Max. Temperature occurred at 2, 3 & 4 P. M. on the 11th & 21st ...	98.5
Min. Temperature occurred at 10 P. M. on the 15th	75 5
Extreme range of the Temperature during the month	23.0
Mean of the daily Max. Temperature	94 8
Ditto ditto Min. ditto,	80.4
Mean daily range of the Temperature during the month	14.4

Mean Wet Bulb Thermometer for the month	80.4
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	6.1
Computed Mean Dew-point for the month	70.7
Mean Dry Bulb Thermometer above computed mean Dew-point	9.8

	Inches.
Mean Elastic force of Vapour for the month	0.902

	Troy grain.
Mean Weight of Vapour for the month	9.60
Additional Weight of Vapour required for complete saturation	3.50
Mean degree of humidity for the month, complete saturation being unity	0.73

	°
Mean Max. Solar radiation Thermometer for the month	142.9

	Inches.
Rained 10 days,—Max. fall of rain during 24 hours	1.05
Total amount of rain during the month	2.90
Total amount of rain indicated by the Gauge* attached to the anemometer during the month	2.14
Prevailing direction of the Wind ... S. & S. S. W.,	

* Height 70 feet 10 inches above ground.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1876.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18 11 feet.

Daily Means, &c of the Observations and of the Hygrometrical elements
dependent thereon

Date	Mean Height of the Barometer at 32° Fahr	Range of the Barometer during the day			Mean Dry Bulb Thermometer	Range of the Tempera- ture during the day.		
		Max	Min	Diff		Max	Min	Diff.
	Inches	Inches	Inches	Inches	o	o	o	o
1	29.632	29.691	29.562	0.129	87.5	97.5	81.5	16.0
2	.648	715	576	.139	87.1	95.4	82.1	13.3
3	.637	.696	554	.142	88.4	97.0	82.0	15.0
4	.614	.677	.517	.160	89.7	98.2	82.5	15.7
5	.594	.693	.492	.201	89.0	97.6	80.0	17.6
6	.604	.664	541	.120	84.9	92.0	78.5	13.5
7	.588	613	533	.110	86.6	91.7	80.6	11.1
8	.583	630	.492	.138	81.2	90.0	75.5	14.5
9	.565	601	.522	.079	81.7	92.5	76.0	16.5
10	.575	616	535	.091	86.7	92.5	82.0	10.5
11	.588	656	533	.123	86.3	93.0	80.2	12.8
12	.597	696	.531	.165	86.8	93.4	79.0	14.4
13	.633	679	573	.106	86.7	93.3	80.5	12.8
14	.595	650	521	.126	87.5	93.4	81.2	12.2
15	.553	.612	499	.114	87.3	92.5	82.5	10.0
16	.544	581	477	.107	89.5	91.8	81.0	10.8
17	.571	626	518	.108	83.3	93.7	77.1	16.6
18	.581	.637	500	.137	83.0	89.6	77.9	11.7
19	.520	.586	.427	.159	84.4	94.2	78.3	15.9
20	.469	.534	401	.133	81.7	88.4	78.0	10.4
21	.471	.554	.418	.136	81.3	88.0	78.8	9.2
22	.455	.493	.403	.090	81.8	88.0	79.0	7.0
23	.501	.576	439	.137	83.8	88.8	78.5	10.3
24	.560	.650	.513	.137	81.1	93.3	77.8	15.5
25	.603	654	540	.114	85.3	93.0	79.4	13.6
26	.609	.650	.553	.097	84.3	89.8	79.5	10.3
27	.627	.675	.572	.103	85.3	91.0	82.0	9.0
28	.553	.613	469	.144	86.1	93.0	80.8	12.2
29	.486	.512	.389	.123	87.4	94.7	82.8	11.9
30	.440	.482	.375	.107	88.2	96.5	83.5	13.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1876.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	82.2	5.3	79.0	8.5	0.970	10.31	3.18	0.76
2	81.9	5.2	78.8	8.3	.964	.27	.06	.77
3	82.4	6.0	78.8	9.6	.964	.23	.61	.74
4	85.1	4.6	82.3	7.4	1.077	11.42	2.95	.80
5	82.1	6.9	78.0	11.0	0.940	9.97	4.11	.71
6	79.4	5.5	75.5	9.4	.968	.29	3.20	.74
7	81.3	5.3	78.1	8.5	.913	10.04	.10	.76
8	78.7	2.5	76.9	4.3	.908	9.78	1.43	.87
9	81.7	3.0	79.6	5.1	.989	10.58	.84	.85
10	82.3	4.4	79.7	7.0	.992	.57	2.61	.80
11	81.3	5.0	77.8	8.5	.931	9.95	3.07	.76
12	82.0	4.8	79.1	7.7	.973	10.36	2.85	.78
13	81.0	5.7	77.6	9.1	.928	9.89	3.29	.75
14	81.9	5.6	78.5	9.0	.955	10.16	.33	.75
15	83.4	3.9	81.1	0.2	1.037	11.04	2.37	.83
16	83.3	5.2	80.2	8.3	.908	10.71	3.17	.77
17	80.8	2.5	79.0	4.3	0.970	.42	1.51	.87
18	80.4	2.6	78.6	4.4	.958	.30	.62	.87
19	81.1	3.3	78.8	5.6	.964	.31	2.00	.84
20	80.1	1.6	79.0	2.7	.970	.44	0.93	.92
21	79.7	1.6	78.6	2.7	.958	.32	.92	.92
22	79.9	1.9	78.6	3.2	.958	.32	1.08	.91
23	80.5	3.3	78.2	5.6	.946	.13	.97	.84
24	80.3	3.8	77.6	6.5	.928	9.93	2.28	.81
25	80.3	5.0	76.8	8.5	.905	.65	.99	.76
26	80.7	3.6	78.2	6.1	.946	10.13	.16	.83
27	81.6	3.7	79.0	6.3	.970	.37	.37	.83
28	82.2	3.9	79.5	6.6	.986	.51	.44	.81
29	83.9	3.5	81.8	5.6	1.060	11.26	.19	.84
30	84.2	4.0	81.8	6.4	.000	.26	.60	.83

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour	Mean Height of the Barometer at 32° Falt.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff		Max	Min	Diff.
	Inches	Inches	Inches	Inches	o	o	o	o
Mid- night	29.584	29.679	29.167	0.212	82.2	86.0	76.0	10.0
1	.572	.660	.462	.198	82.0	85.6	76.0	9.6
2	.560	.646	.434	.212	81.9	85.4	76.5	8.9
3	.551	.642	.414	.228	81.7	85.2	77.0	8.2
4	.549	.635	.428	.207	81.6	85.0	77.0	8.0
5	.558	.645	.447	.198	81.5	84.8	77.5	7.3
6	.572	.659	.455	.204	81.7	85.3	78.0	7.3
7	.587	.685	.458	.227	82.7	86.5	78.8	7.7
8	.600	.708	.473	.235	84.7	88.5	79.0	9.5
9	.607	.715	.467	.248	86.7	90.5	79.6	10.9
10	.605	.700	.479	.221	88.1	93.0	79.7	13.3
11	.599	.689	.465	.224	89.5	95.5	80.5	15.0
Noon	.585	.666	.439	.227	90.9	96.3	80.5	15.8
1	.567	.643	.421	.222	91.1	97.7	79.8	17.9
2	.546	.639	.404	.235	91.3	97.8	78.5	19.3
3	.526	.616	.387	.239	91.1	98.2	77.5	20.7
4	.511	.597	.375	.222	90.1	98.0	78.0	20.0
5	.507	.577	.375	.202	88.7	96.5	78.0	18.5
6	.518	.595	.390	.205	87.5	93.5	78.0	15.5
7	.540	.615	.412	.203	85.7	91.5	77.4	14.1
8	.564	.641	.433	.208	84.8	89.6	76.5	13.1
9	.583	.669	.466	.203	84.0	88.0	76.5	11.5
10	.596	.693	.466	.227	83.2	87.0	76.2	10.8
11	.596	.696	.468	.228	82.5	86.4	75.5	10.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon — (*Continued*).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night	79.6	2.6	77.8	4.4	.934	10.05	1.49	0.87
1	79.6	2.4	77.9	4.1	.937	.08	.39	.88
2	79.7	2.2	78.2	3.7	.946	.17	.27	.89
3	79.7	2.0	78.3	3.1	.949	.22	.15	.90
4	79.8	1.8	78.5	3.1	.955	.29	.05	.91
5	79.8	1.7	78.6	2.9	.958	.32	0.99	.91
6	80.0	1.7	78.8	2.9	.964	.38	.99	.91
7	80.6	2.1	79.1	3.6	.973	.45	1.27	.89
8	81.4	3.3	79.1	5.6	.973	.40	2.02	.84
9	82.2	4.5	79.5	7.2	.986	.51	.67	.80
10	82.7	5.4	79.5	8.6	.986	.47	3.25	.76
11	83.3	6.2	79.0	9.9	.989	.48	.81	.73
Noon.	83.8	7.1	79.5	11.4	.986	.43	4.46	.70
1	84.2	6.9	80.1	11.0	1.005	.60	.37	.71
2	84.2	7.1	79.9	11.4	0.998	.54	.52	.70
3	84.2	6.9	80.1	11.0	1.005	.60	.37	.71
4	83.6	6.5	79.7	10.4	0.992	.51	.03	.72
5	83.0	5.7	79.6	9.1	.989	.50	3.46	.75
6	82.4	5.1	79.3	8.2	.979	.42	.07	.77
7	81.4	4.3	78.4	7.3	.952	.17	2.63	.80
8	81.0	3.8	78.3	6.5	.949	.14	.32	.81
9	80.6	3.4	78.2	5.8	.940	.13	.04	.83
10	80.0	3.2	77.8	5.4	.964	.03	1.86	.84
11	79.7	2.8	77.7	4.8	.931	.00	.64	.86

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches		lb	Miles.	
1	150.0	...	S	...	116.3	\i to 2, \i to 5, \i to 7 A. M. \i to 7, \i to 9, B to 11 P. M. T at 4 P. M., D at 5 & 7 P. M.
2	152.0	...	S & S E	...	117.5	B to 6 A. M., \i to 3, O to 5, \i to 9, \i to 11 P. M. T at 3 P. M.
3	149.0	...	S S E & S	1.2	120.4	\i to 2, B to 5, \i to 7 A. M., \i to 3, \i to 8, S to 11 P. M. T at 2 P. M. D at 9½ A. M.
4	148.5	...	S & S S W		162.9	\i to 7 A. M., \i to 4, \i to 11 P. M.
5	145.0	0.03	S & S S W	1.4	196.4	\i to 5, \i to 8, O to 11 P. M. T at 9 & 10 P. M. L from 6½ to 10 P. M. Light R at 8½, 10½ & 11½ P. M.
6	142.0	...	S S W & S	...	175.9	O to 7 A. M., \i to 1, S to 7, O to 9, \i to 11 P. M. Sheet L on W at 10 & 11 P. M.
7	142.0	0.02	S S E & S	0.8	185.0	\i to 3 A. M., O to 9, \i to 11 P. M. L at 8, 10 & 11 P. M. Light R at 9 & 10 A. M. & 9½ P. M.
8	135.0	1.36	S by W & S S E	8.1	177.7	O to 6, \i to 10 A. M., O to 11 P. M. T at 11 & 12 & from 7 to 9 P. M. L from 7 to 9 P. M. R after intervals.
9	146.0	0.02	S S W & S	1.7	197.7	O to 9 A. M., \i to 2, S to 4, O to 11 P. M. Sheet L on W at 8 P. M. Light R at Midnight & 5½ A. M.
10	141.0	0.03	S & S S W	7.2	302.3	O to 6, \i to 8 A. M., \i to 5, S to 7, O to 11 P. M. T between 8 & 9 P. M. L from 8 to 10 P. M. Light R at 7½ P. M.
11	144.0	...	E by S, S S W & S	2.8	285.7	S to 4, \i to 10 A. M., \i to 6, B to 8, O to 11 P. M. Sheet L on W at 8 P. M. D at 11½ P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,
 \i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning,
 R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches.		lb.	Miles.	
12	139.5	0.10	S by W, S & S S E	2.0	297.8	B to 7 A. M., \sim i to 8, \sim i to 7, B to 9, O to 11 P. M. T at 11 P. M. L from 8½ to 11 P. M. R between 10 & 11 P. M.
13	140.0	0.02	S & S S W	1.4	304.1	O to 4, \sim i to 8 A. M., \sim i to 7, S to 11 P. M. T at Midnight, L at Midnight, 1 A. M. & from 8 to 10 P. M. Light R at Midnight, 1 & 2 P. M.
14	142.5	...	S S W	2.3	341.6	O to 9 A. M., \sim i to 6, \sim i to 8, O to 11 P. M. L from 7½ to 11 P. M. D at 8½, 9½, 10½ & 11 P. M.
15	135.0	0.03	S S W & S	7.2	332.3	O to 12, S to 11 P. M. Sheet L from 7½ to 10 P. M. Light R at Midnight, 2 & 6½ A. M.
16	112.0	...	S by W & S	0.2	239.5	S to 1, O to 6 A. M., S to 11 P. M.
17	141.0	1.03	S	2.0	221.0	O to 4, \sim i to 11 A. M., O to 11 P. M. T from 11 A. M. to 4 P. M. L at 1 P. M. R from 12½ to 7½ P. M.
18	125.0	0.20	S	...	128.2	S to 4 A. M., \sim i to 12, O to 8, B to 11 P. M. Sheet L on S at 11 P. M. Slight R from 12½ to 2½ & at 5 P. M.
19	148.7	2.01	S, E by N & NN W	...	93.8	S to 3, \sim i to 6, \sim i to 8 A. M., \sim i to 8, O to 11 P. M. T between 4 & 5 P. M. Sheet L at Midnight, 1 A. M., 10 & 11 P. M. R at 4 & from 6½ to 10 P. M.
20	136.0	0.27	S W & Variable	...	133.2	\sim i & \sim i to 4 A. M., O to 12, \sim i to 4, O to 11 P. M. Slight R from 6½ to 11 A. M.
21	126.8	2.48	S S W & S	1.9	149.8	Chiefly O. T from 3 to 9 P. M. L from 6 to 8 P. M. R nearly the whole day.

\sim i Cirri, — i Strati, \sim i Cumuli, \sim i Cirro-strati, \sim i Cumulo-strati, \sim i Nimbi, \sim i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning, R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1876.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches.		lb	Miles.	
22	...	1.13	S S W & S W	0.5	180.1	O. Shoot L at 8 & 11 P. M. R at 1, 6, 8 & 9 A. M. & 7½ & 11 P. M.
23	135.7	0.16	S W & W	1.3	190.3	O to 11 A. M., S to 6, O to 11 P. M. T & L at Midnight & from 6½ to 11 P. M. Slight R at Midnight, 3 A. M. & from 8½ to 10 P. M.
24	145.0	...	S S W & S W	...	165.6	O to 4, ~i to 7, B to 10 A. M., ~i to 4, O to 6, S to 11 P. M. L from Midnight to 3 A. M. & 8 to 10 P. M. D at Midnight, 1 & 3 A. M.
25	145.0	...	S E & S by E	...	100.1	S to 4 A. M., ~i to 2, O to 7, ~i to 9, S to 11 P. M. L between 10 & 11 P. M. D at 3½, 4 & 11 P. M.
26	145.6	0.06	S W & S	...	86.3	~i to 4, ~i to 8, O to 10 A. M., ~i to 7, ~i to 11 P. M. T & L at Midnight & 6 P. M. Light R at 6 P. M.
27	146.0	0.04	S & S S W	...	84.3	S to 1, O to 4, ~i to 9 A. M., ~i to 6, ~i to 11 P. M. Light R at 2 P. M.
28	144.5	...	S & S S E	...	153.7	B to 7 A. M., ~i to 11 P. M. T & L at 6½ P. M. D at 6½ & 8½ P. M.
29	146.0	...	S & S by W	...	120.7	B to 5 A. M., ~i to 4, S to 7, ~i to 11 P. M. T at 4 P. M. L on W at 8 P. M., D at 4 & 6 P. M.
30	141.5	0.38	S by E	...	133.5	S to 4, ~i to 7 A. M., ~i to 5, ~i to 8, S to 11 P. M. R from 4½ to 5½ P. M.

~i Cirri — i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,
~i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1876.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29 566
Max. height of the Barometer occurred at 9 A. M. on the 2nd	29 715
Min. height of the Barometer occurred at 4 & 5 P. M. on the 30th	29 375
Extreme range of the Barometer during the month	0 340
Mean of the daily Max. Pressures	29 625
Ditto ditto Min. ditto	29 499
Mean daily range of the Barometer during the month	0.126

	°
Mean Dry Bulb Thermometer for the month	85 0
Max. Temperature occurred at 3 P. M. on the 4th... ..	98 2
Min. Temperature occurred at 11 P. M. on the 8th	75 5
Extreme range of the Temperature during the month	22.7
Mean of the daily Max. Temperature	92.8
Ditto ditto Min. ditto,	80 1
Mean daily range of the Temperature during the month	12 7

Mean Wet Bulb Thermometer for the month	81.5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	4 1
Computed Mean Dew-point for the month	78 6
Mean Dry Bulb Thermometer above computed mean Dew-point	7 0

	Inches.
Mean Elastic force of Vapour for the month	0 958

	Troy grain.
Mean Weight of Vapour for the month	10.23
Additional Weight of Vapour required for complete saturation	2.53
Mean degree of humidity for the month, complete saturation being unity	0.80

	°
Mean Max. Solar radiation Thermometer for the month	141.0

	Inches.
Rained 26 days,—Max. fall of rain during 24 hours	2.43
Total amount of rain during the month	9.32
Total amount of rain indicated by the Gauge* attached to the anemometer during the month	under repair.
Prevailing direction of the Wind	S. & S. W.,

* Height 70 feet 10 inches above ground.

Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta. in the month of June 1876.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

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*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1876.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18 11 feet.

Daily Means, &c of the Observations and of the Hygrometrical elements
dependent thereon

Date	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff		Max.	Min	Diff
	Inches.	Inches.	Inches.	Inches.	o	o	o●	o
1	29.418	29.515	29.377	0.138	88.7	95.5	83.5	12.0
2	.452	.516	.384	.132	83.8	87.5	80.2	7.3
3	.476	.533	.438	.095	81.6	84.5	78.6	5.9
4	.496	.542	.411	.101	82.3	85.6	79.2	6.4
5	.482	.533	.417	.116	84.3	88.0	81.5	6.5
6	.521	.585	.476	.109	85.1	89.7	82.0	7.7
7	.541	.574	.483	.091	84.7	86.5	83.0	3.5
8	.514	.559	.452	.107	81.0	82.6	78.5	4.1
9	.411	.493	.374	.119	81.6	86.0	79.0	7.0
10	.489	.582	.423	.159	83.3	89.0	80.0	9.0
11	.551	.599	.511	.088	82.5	86.2	80.5	5.7
12	.524	.544	.467	.117	83.4	87.8	80.0	7.8
13	.513	.556	.456	.100	84.3	90.6	80.3	10.3
14	.529	.568	.483	.085	83.2	87.1	80.5	6.6
15	.517	.563	.451	.109	81.7	86.4	79.0	7.4
16	.474	.537	.398	.139	81.3	85.5	79.5	6.0
17	.410	.481	.391	.087	80.0	81.8	79.0	2.8
18	.429	.495	.377	.118	78.2	80.1	77.0	3.4
19	.534	.639	.452	.187	78.9	80.8	77.0	3.8
20	.622	.666	.573	.093	82.8	87.6	74.0	9.6
21	.585	.640	.507	.133	83.1	88.9	79.5	9.4
22	.532	.584	.450	.128	83.5	88.4	79.3	9.1
23	.457	.514	.392	.122	84.3	89.8	81.5	8.3
24	.461	.515	.408	.107	83.6	89.0	80.4	8.6
25	.496	.533	.458	.075	83.9	88.5	80.0	8.5
26	.482	.527	.414	.113	83.3	87.5	79.5	8.0
27	.468	.530	.416	.111	83.0	84.5	81.2	7.3
28	.451	.506	.377	.129	81.1	83.6	78.8	4.8
29	.480	.551	.438	.113	80.3	84.2	76.1	7.8
30	.534	.579	.487	.092	82.6	86.0	80.0	6.0
31	.571	.616	.517	.099	82.3	85.6	79.8	5.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1876.*

Daily Means, &c of the Observations and of the Hygrometrical elements dependent thereon — (Continued.)

Date	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point	Dry Bulb above Dew Point.	Mean Elastic force of vapour	Mean Weight of Vapour in a Cubic foot of air	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°	°	°	°	Inches	Gr	Gr	
1	83.9	4.8	81.0	7.7	1.031	10.96	3.00	0.79
2	81.6	2.2	80.1	3.7	.005	73	1.35	.89
3	80.3	1.3	79.4	2.2	0.983	54	0.76	.93
4	80.1	1.0	79.1	3.2	.973	17	1.11	.90
5	81.6	2.7	79.7	4.6	.992	61	.67	.86
6	82.3	2.4	80.3	4.8	1.011	80	.77	.86
7	81.4	3.3	79.1	5.6	0.973	40	2.02	.81
8	79.7	1.3	78.8	2.2	.964	40	0.71	.93
9	79.8	1.8	78.5	3.1	.955	29	1.05	.91
10	80.4	2.9	78.4	4.9	.952	21	.72	.86
11	80.5	2.0	79.1	3.4	.973	47	.17	.90
12	80.8	2.6	79.9	4.4	.970	42	.54	.87
13	80.7	3.6	78.2	6.1	.916	13	2.15	.83
14	80.7	2.5	78.9	4.3	.967	.39	1.50	.87
15	79.9	1.8	78.6	3.1	.958	32	.05	.91
16	79.6	1.7	78.1	2.9	.952	.25	0.99	.91
17	78.6	1.4	77.6	2.4	.928	.03	.78	.93
18	76.9	1.3	76.0	2.2	.892	9.56	.69	.93
19	77.5	1.4	76.5	2.4	.896	.71	.76	.93
20	79.6	3.2	77.1	5.4	.922	91	1.81	.84
21	80.2	3.2	78.0	5.4	.910	10.09	.87	.84
22	80.3	3.2	78.1	5.4	.943	.12	.88	.84
23	81.7	2.6	79.9	4.4	.998	69	.59	.87
24	80.5	3.1	78.3	5.3	.910	.18	.85	.85
25	80.8	3.1	78.6	5.3	.958	.28	.85	.85
26	80.5	2.8	78.5	4.8	.955	.25	.68	.86
27	81.0	2.0	79.6	3.1	.989	.63	.19	.90
28	80.0	1.1	79.2	1.9	.976	.52	0.65	.94
29	78.7	1.6	77.6	2.7	.924	.01	.90	.92
30	79.7	2.9	77.7	4.9	.931	.00	1.68	.86
31	79.6	2.7	77.7	4.6	.931	.00	.58	.86

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches	Inches	Inches	°	°	°	°
Mid- night	29.523	29.633	29.410	0.193	81.4	86.0	78.2	7.8
1	.510	.620	.433	.187	81.2	85.5	78.0	7.5
2	.497	.612	.417	.195	80.9	85.1	77.2	7.9
3	.485	.604	.388	.216	80.7	84.6	76.8	7.8
4	.476	.600	.395	.205	80.5	84.2	76.4	7.8
5	.481	.613	.408	.205	80.3	84.0	76.4	7.6
6	.497	.629	.419	.210	80.3	83.8	77.0	6.8
7	.512	.648	.431	.217	80.9	84.5	77.0	7.5
8	.525	.654	.439	.215	81.9	86.5	77.4	9.1
9	.533	.664	.449	.215	81.0	89.0	77.5	11.5
10	.531	.666	.451	.212	81.1	91.0	78.0	13.0
11	.524	.661	.449	.212	85.3	92.8	78.5	14.3
Noon	.513	.652	.435	.217	85.6	93.8	78.5	15.3
1	.499	.629	.414	.215	85.1	93.8	78.0	15.8
2	.482	.615	.397	.218	85.2	95.0	80.4	14.6
3	.466	.603	.383	.220	85.1	95.5	79.4	16.1
4	.454	.584	.371	.210	84.9	95.5	79.0	16.5
5	.450	.579	.377	.202	84.1	95.0	78.8	16.2
6	.462	.573	.391	.182	83.7	90.0	77.5	13.1
7	.483	.589	.403	.186	82.7	88.5	77.5	11.0
8	.503	.609	.420	.189	82.2	86.8	77.0	9.8
9	.523	.627	.442	.185	81.9	86.8	77.3	9.5
10	.539	.639	.455	.184	81.7	86.5	78.0	8.5
11	.538	.636	.449	.187	81.5	86.5	78.0	8.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
-Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon — (Continued).

Hour	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Corrected Dew Point.	Wet Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches	Gr.	Gr.	
Mid- night	79.0	15	78.8	2.6	.964	10.38	0.89	0.92
1	79.7	15	78.6	2.6	.958	.32	.89	.92
2	79.6	13	78.7	2.2	.961	.39	.73	.93
3	79.4	13	78.5	2.2	.956	.31	.73	.93
4	79.3	12	78.5	2.0	.955	.31	.67	.94
5	79.3	10	78.6	1.7	.958	.34	.57	.95
6	79.3	10	78.6	1.7	.958	.31	.57	.95
7	79.6	13	78.7	2.2	.961	.37	.73	.93
8	80.1	18	78.8	3.1	.964	.38	1.06	.91
9	80.5	25	78.7	4.3	.961	.33	.49	.87
10	80.9	32	78.7	5.4	.961	.31	.90	.84
11	81.3	40	78.5	6.8	.955	.21	2.43	.81
Noon	81.4	42	78.5	7.1	.955	.21	.55	.80
1	81.3	41	78.4	7.0	.952	.17	.51	.80
2	81.3	39	78.6	6.6	.958	.23	.38	.81
3	81.3	38	78.6	6.5	.958	.23	.34	.81
4	81.1	38	78.4	6.5	.952	.17	.32	.81
5	80.9	35	78.4	6.0	.952	.19	.12	.83
6	80.5	32	78.3	5.4	.949	.18	1.89	.84
7	80.1	26	78.3	4.4	.949	.20	.52	.87
8	79.9	23	78.3	3.9	.949	.20	.34	.88
9	80.0	19	78.7	3.2	.961	.35	.09	.91
10	79.9	18	78.6	3.1	.958	.32	.05	.91
11	80.0	15	78.9	2.6	.967	.41	0.90	.92

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.		Max. Pressure.	Daily Velocity.	General aspect of the Sky.
			Prevailing direction.				
	°	Inches			lb	Miles.	
1	153.0	...	S & S E	...	...	139.0	S to 4, \i to 11 A. M., \i to 4, \i to 9, \i to 11 P. M.
2	...	5.41	E N E, N E & S W	...	...	162.2	Chiefly O. T & L from 1½ to 8 P. M. R at 1½ & from 7 A. M. to 10 P. M.
3	...	1.25	S S W & S	1.0	...	201.6	O to 7, S to 11 P. M. T at 3 P. M. R from 1 to 9½ A. M. & at 3 P. M.
4	127.5	0.06	S & S by W	.	...	181.5	S to 3, O to 7 A. M., S to 11 P. M. Light R from 5½ to 7½ A. M.
5	141.0	...	S by W & S	...	...	215.8	S to 5, \i to 8 A. M., \i to 12, S to 2, O to 7, S to 11 P. M.
6	135.0	...	S & S S W	...	...	207.8	S to 4, \i to 6, \i to 8 A. M., S to 1, O to 9, S to 11 P. M. T at 3½ & 4 P. M. L on S at 7½ P. M.
7	130.0	...	S W & S by W	...	...	132.3	S to 2, O to 6, \i to 9 A. M., O to 2, S to 5, O to 11 P. M. D at 5 A. M. & 1 P. M.
8	...	0.40	[& S W S by W, W S W	...	...	89.4	S to 5 A. M., O to 11 P. M. T at 8 A. M. Slight R after intervals from 6 A. M. to 11 P. M.
9	...	0.40	E & Variable	...	...	89.1	O to 2, \i to 6, S to 11 P. M. Slight R after intervals.
10	135.0	0.10	S by E & S	0.3	...	155.1	S to 6, O to 8 A. M., \i to 7, B to 11 P. M. Slight R from 7 to 8½ & at 11½ A. M.
11	142.2	0.07	[by E S, S by W & S	...	...	202.4	O to 2, \i to 5, \i to 9. \i to 11 A. M., O to 5, S to 11 P. M. Light R at Midnight, 5½ A. M., 12, 2, & 3 P. M.
12	140.0	0.76	S by E & S			116.1	S to 6, O to 8 A. M., \i to 7, B to 11 P. M. T at 12½ P. M. R at 7 A. M. & 8½ P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cusulo-strati, \i Nimbi,
\i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning,
K rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.		General aspect of the Sky.
			Prevailing direction.	Max Pressure Daily Velocity	
		Inches		lb Miles	
13	141.0	.	S by E & S	113.3	Vi to 3, Scuds to 6, Vi to 8 A. M., Ci to 6, S to 11 P. M. Sheet L on N from 7½ to 9 P. M. D nt 3 & 4½ P. M.
14	127.5	...	S S E & S	110.2	S to 7 A. M., Ci to 12, O to 4, S to 7, Vi to 11 P. M. Sheet L on N at 2 A. M. D at 12½ P. M.
15	130.6	1.14	S S W & S W	129.6	Vi to 4, O to 10 A. M., Ci to 12, S to 11 P. M. Sheet L on S at 11 P. M. R from 6 to 8½ A. M. & 1 to 4½ P. M.
16	130.0	0.22	S S W & S W	71.2	O to 11 A. M., Ci to 6, O to 11 P. M. Sheet L on N at Mid-night. Slight R after intervals.
17	...	0.20	S S W & S W	153.1	S to 3 A. M., O to 7, Vi to 9, O to 11 P. M. Slight R after intervals from 4 A. M. to 4½ P. M.
18	...	0.48	S S W & S W	101.0	O. Slight R after intervals.
19	...	2.11	S S W & S	6.0 191.7	O to 1, S to 6 A. M., O to 11 P. M. T at 1 P. M. R from 7 A. M. to 9 P. M.
20	140.0	.	S by W & S S W	108.0	O to 5 A. M., S to 12, Vi & Vi to 7, B to 11 P. M. Sheet L on S W at 11 P. M.
21	140.0	1.04	S S W	191.0	Vi to 6, Scuds to 9 A. M., Ci to 5, O to 11 P. M. T at 9 P. M. L at Midnight & 9 P. M. R after intervals from 2 to 8 P. M.
22	139.5	...	S S W & S	112.7	O to 2, Vi to 5, Vi to 9 A. M., Ci to 7, B to 11 P. M.
23	140.0	0.49	S by E & S	64.3	Vi to 6 A. M., Ci to 7, B to 11 P. M. T between 2 & 3 P. M. R after intervals from 12 to 6 P. M.
24	140.0	0.11	E & S E	1.6 178.4	B to 3, Vi to 6, Scuds to 9 A. M., Ci to 5, Vi to 8, S to 11 P. M. R at 11½ A. M. & 12½ P. M.

Vi Cirri, —i Strati, Ci Cumuli, Ci Cirro-strati, Ci Cumulo-strati, Vi Mist, Vi Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L Night rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1876.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches.		lb	Miles	
25	139.5	0.22	E by S & S	0.8	234.0	S to 1. O to 6 A. M., ~i to 11 P. M. Slight R at 2½, 6 A. M., 12½ & 1½ P. M.
26	141.0	0.37	SSE, S & S by W	...	145.3	O to 1, ~i to 7, O to 10 A. M., ~i to 7, ~i to 11 P. M. R at Midnight, 5, 8 A. M., 1 & 3 P. M.
27	139.0	0.27	S by W, S & SE	...	116.5	S to 8 A. M. ~i to 12, O to 5, S to 11 P. M. T from 1½ to 3 P. M. L at 9 P. M. R from 1 to 4 P. M.
28	...	1.17	SE & S by W	1.7	61.4	S to 6 A. M., O to 11 P. M. Sheet L on W at Midnight. R from 7½ A. M. to 5 & at 8½ P. M.
29	...	1.78	S by E & SSW	2.2	89.2	O. R after intervals from Midnight to 6 P. M.
30	126.5	1.06	SW & SSW	0.5	250.5	O to 8 A. M., S to 4, O to 11 P. M. R from Midnight to 3, at 7, 8 A. M. & 2½ P. M.
31	...	0.28	SW & S by W	1.2	171.3	O. Slight R after intervals.

~i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,
~i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1876.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.500
Max. height of the Barometer occurred at 10 A. M. on the 20th	29.666
Min. height of the Barometer occurred at 4 P. M. on the 9th	29.374
Extreme range of the Barometer during the month	0.292
Mean of the daily Max. Pressures	29.555
Ditto ditto Min. ditto	29.442
Mean daily range of the Barometer during the month	0.113

	°
Mean Dry Bulb Thermometer for the month	82.7
Max. Temperature occurred at 3 & 4 P. M. on the 1st	95.5
Min. Temperature occurred at 4 & 5 A. M. on the 29th	76.4
Extreme range of the Temperature during the month	19.1
Mean of the daily Max. Temperature	86.8
Ditto ditto Min. ditto,	79.8
Mean daily range of the Temperature during the month	7.0

Mean Wet Bulb Thermometer for the month	80.3
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	2.4
Computed Mean Dew-point for the month	78.6
Mean Dry Bulb Thermometer above computed mean Dew-point	4.1

	Inches.
Mean Elastic force of Vapour for the month	0.958

	Grain.
Mean Weight of Vapour for the month	10.30
Additional Weight of Vapour required for complete saturation	1.42
Mean degree of humidity for the month, complete saturation being unity	0.88

	°
Mean Max. Solar radiation Thermometer for the month	137.1

	Inches.
Rained 26 days,—Max. fall of rain during 24 hours	5.41
Total amount of rain during the month	19.39
Total amount of rain indicated by the Gauge* attached to the anemometer during the month	under repair.
Prevailing direction of the Wind S, S S W. & S. W.	

* Height 70 feet 10 inches above ground.

MONTHLY RESULTS.

Tables showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1876.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 29° Fah.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.605	29.680	29.549	0.131	83.0	88.5	80.0	8.5
2	.638	.682	.575	.107	82.7	90.3	77.7	12.6
3	.653	.708	.586	.122	82.9	89.8	77.5	12.3
4	.666	.716	.625	.091	80.6	87.0	78.0	9.0
5	.666	.715	.596	.119	83.1	87.3	80.2	7.1
6	.609	.678	.534	.144	83.2	89.0	78.5	10.5
7	.586	.625	.530	.096	81.4	84.4	79.3	5.1
8	.612	.671	.565	.106	82.1	87.5	78.5	9.0
9	.671	.733	.623	.110	81.9	90.7	81.0	9.7
10	.688	.752	.613	.139	84.4	88.8	81.2	7.6
11	.614	.674	.541	.133	84.3	88.7	80.5	8.2
12	.542	.596	.473	.123	83.2	88.8	78.8	10.0
13	.522	.563	.479	.084	81.4	83.5	78.6	4.9
14	.572	.632	.525	.107	80.2	83.2	78.0	5.2
15	.589	.657	.502	.155	81.5	86.5	77.5	9.0
16	.526	.579	.446	.133	81.6	85.0	80.0	5.0
17	.479	.521	.422	.099	81.9	87.0	79.5	7.5
18	.468	.520	.396	.124	82.5	86.5	80.3	6.2
19	.506	.595	.400	.185	82.2	87.2	80.0	7.2
20	.591	.673	.535	.138	82.0	88.0	80.6	7.4
21	.634	.690	.579	.111	82.6	86.5	79.0	7.5
22	.664	.707	.599	.108	82.5	87.1	80.5	6.6
23	.661	.709	.598	.111	83.2	89.5	80.0	8.5
24	.676	.729	.628	.101	82.5	87.4	79.6	7.8
25	.672	.718	.600	.118	83.2	90.7	78.5	12.2
26	.690	.743	.630	.118	83.6	89.8	80.2	9.6
27	.716	.773	.645	.128	84.0	90.5	80.5	10.0
28	.718	.784	.628	.156	85.3	91.5	80.5	11.0
29	.674	.738	.578	.160	85.8	92.0	81.3	10.5
30	.591	.653	.505	.147	85.5	90.6	82.5	8.1
31	.501	.560	.417	.143	84.9	90.5	81.5	9.0

* The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1876.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	Gr.	Gr.	
1	79.5	3.5	77.0	6.0	0.910	9.77	2.05	0.83
2	79.4	3.3	77.1	5.6	.913	.80	1.92	.84
3	80.3	2.6	78.5	4.4	.955	10.27	.52	.87
4	79.1	1.5	78.0	2.6	.940	.13	0.88	.92
5	79.9	3.2	77.7	5.4	.931	.00	1.86	.84
6	80.2	3.0	78.1	5.1	.943	.12	.77	.85
7	79.6	1.8	78.3	3.1	.910	.22	.05	.91
8	80.1	2.0	78.7	3.4	.961	.35	.16	.90
9	81.5	3.4	79.1	5.8	.973	.46	2.09	.83
10	80.9	3.5	78.4	6.0	.952	.19	.12	.83
11	80.9	3.4	78.5	5.8	.955	.23	.05	.83
12	80.8	2.4	79.1	4.1	.973	.45	1.44	.88
13	79.9	1.5	78.8	2.6	.964	.88	0.89	.92
14	78.5	1.7	77.3	2.9	.919	9.92	.96	.91
15	79.1	2.4	77.4	4.1	.922	.93	1.38	.88
16	80.3	1.3	79.4	2.2	.983	10.58	0.76	.93
17	80.6	1.3	79.7	2.2	.992	.68	.76	.93
18	80.9	1.6	79.8	2.7	.995	.69	.95	.92
19	80.4	1.8	79.1	3.1	.973	.47	1.07	.91
20	80.3	1.7	79.1	2.9	.973	.47	.00	.91
21	80.1	2.5	78.3	4.3	.949	.20	.48	.87
22	80.7	1.8	79.4	3.1	.983	.56	.08	.91
23	81.0	2.2	79.5	3.7	.986	.57	.32	.89
24	80.2	2.3	78.6	3.9	.958	.80	.34	.89
25	80.3	2.9	78.3	4.9	.949	.18	.71	.86
26	80.5	3.1	78.3	5.3	.949	.18	.85	.85
27	80.6	3.4	78.2	5.8	.946	.13	2.04	.88
28	81.2	4.1	78.3	7.0	.949	.14	.50	.80
29	81.3	4.5	78.1	7.7	.943	.06	.77	.78
30	81.3	4.2	78.4	7.1	.952	.17	.55	.80
31	80.9	4.0	78.1	6.8	.943	.08	.41	.81

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night	29.637	29.785	29.508	0.232	81.3	83.7	78.5	5.2
1	.626	.727	.491	.233	81.1	83.3	78.5	4.8
2	.612	.719	.472	.217	80.0	83.0	78.3	4.7
3	.601	.720	.461	.259	80.7	82.6	78.3	4.3
4	.596	.730	.451	.279	80.4	82.5	78.0	4.5
5	.606	.740	.460	.280	80.2	82.5	77.5	5.0
6	.620	.750	.474	.276	80.2	82.5	77.7	4.8
7	.632	.758	.490	.268	80.6	83.0	78.2	4.8
8	.616	.779	.495	.281	81.7	81.2	78.0	0.2
9	.656	.781	.497	.287	83.0	86.0	78.0	8.0
10	.655	.781	.506	.275	81.1	87.7	79.2	8.5
11	.647	.768	.494	.274	85.8	80.3	80.0	9.3
Noon	.682	.742	.496	.246	85.9	90.0	81.0	9.0
1	.609	.719	.461	.258	86.4	90.5	80.4	10.1
2	.588	.691	.440	.251	87.0	91.5	80.5	11.0
3	.588	.654	.405	.219	86.6	92.0	79.3	12.7
4	.556	.650	.400	.250	85.7	91.5	78.5	13.0
5	.553	.645	.396	.210	81.0	89.2	78.5	10.7
6	.563	.663	.407	.256	81.2	86.0	80.2	7.8
7	.582	.687	.420	.258	83.2	86.0	78.8	7.2
8	.697	.709	.461	.218	82.5	85.5	78.8	6.7
9	.627	.735	.481	.251	82.2	85.0	79.4	5.6
10	.645	.748	.493	.255	81.7	81.3	77.5	6.8
11	.639	.752	.484	.268	81.4	81.0	78.0	6.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	Gr.	Gr.	
Mid- night.								
1	79.8	1.5	78.7	2.6	.961	10.35	0.89	0.92
2	79.7	1.4	78.7	2.4	.961	.37	.80	.93
3	79.5	1.4	78.5	2.4	.955	.31	.79	.93
4	79.3	1.4	78.3	2.4	.949	.24	.80	.93
5	79.2	1.2	78.4	2.0	.952	.27	.67	.94
6	79.1	1.1	78.3	1.9	.949	.24	.64	.94
7	79.1	1.1	78.3	1.9	.949	.24	.64	.94
8	79.4	1.2	78.6	2.0	.959	.34	.47	.94
9	79.7	2.0	78.3	3.4	.949	.22	1.15	.90
10	80.3	2.7	78.4	4.6	.952	.21	.61	.86
11	80.6	3.5	78.1	6.0	.943	.10	2.11	.83
12	81.3	4.0	78.5	0.8	.955	.21	.43	.81
Noon.								
1	81.3	4.6	78.1	7.8	.943	.06	.81	.78
2	81.6	4.8	78.2	8.2	.946	.09	.97	.77
3	81.8	5.2	78.7	8.3	.961	.24	3.06	.77
4	81.7	4.9	78.8	7.8	.964	.27	2.87	.78
5	81.1	4.6	77.9	7.8	.937	.00	.80	.78
6	81.1	3.0	78.4	6.5	.952	.17	.32	.81
7	80.9	3.3	78.6	5.6	.959	.26	1.98	.84
8	80.6	2.6	78.8	4.4	.964	.36	.53	.87
9	80.3	2.3	78.6	3.9	.959	.50	.34	.89
10	80.3	1.9	79.0	3.2	.970	.44	.10	.92
11	80.0	1.7	78.8	2.9	.964	.38	0.99	.91
12	79.9	1.5	78.8	2.6	.964	.38	.89	.93

All the Hygrometrical elements are computed by the Greenwich Computation.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches		lb	Miles.	
1	140.0	0.06	S S W & S W	...	99.8	O to 11 A. M., S to 11 P. M. Light R at Midnight, 1, 2, 6 A. M., 4½ & 10 P. M.
2	148.0	0.40	S W & S S W	3.9	104.4	O to 8, \i to 11 A. M., \i to 1, \i to 4, O to 11 P. M T & L from 5½ to 11 P. M. R from 3 to 8 A. M., 6½ to 7½ & at 11 P. M.
3	140.0	2.15	S S W & S by W	1.4	93.3	O to 8, \i to 11 A. M., \i to 5, S to 7, O to 11 P. M. T & L from 7½ to 11 P. M. R from Midnight to 5 A. M. & 9½ to 11 P. M.
4	135.0	2.21	S by W & S S W	1.8	121.2	O to 10 A. M., S to 1, \i to 3, O to 11 P. M. T at Midnight, 1 A. M. & from 3½ to 5 P. M. L at Midnight, 1 A. M. & from 8 to 11 P. M. R from Midnight to 5 at 8 A. M. & from 3½ to 7 P. M.
5	140.0	...	S S W & W S W	...	72.6	O to 4, \i to 9 A. M., \i to 6, O to 11 P. M. T at 7½ P. M. L at Midnight, 7½ & 8 P. M. D at 1 A. M. & 9 P. M.
6	139.8	0.09	S W & W S W	...	68.8	O to 8 A. M., \i to 12, \i to 9, O to 11 P. M. T at 11½ P. M. L at 7, 9 & 11½ P. M. R at 3, 4½, 6½ A. M. & from 9½ to 11 P. M.
7	110.0	1.92	W S W & S S W	1.2	65.5	O to 1, \i to 7 A. M., O to 4, S to 6, \i to 8, S to 11 P. M. T & L at Midnight, R at Midnight & 1 & from 9 A. M. to 3 P. M.
8	136.3	...	S & S by W	...	57.7	O to 2, \i & \i to 11 P. M. D at 1 & 9 A. M.
9	141.5	...	S & S by W	...	31.7	\i to 2, \i to 6 A. M., \i to 5, \i to 11 P. M.
10	135.0	0.04	S & S E	...	56.6	\i to 7 A. M., \i to 7, S to 11 P. M. T at 1½ P. M. Light R at 8 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,
 \i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
 M rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity	
		Inches		lb	Miles.	
11	142.0	0.32	S E & S by E	...	97.3	☉ to 2, ☁ to 5 A. M., ☁ to 7, S to 11 P. M. R from 7½ to 9½ P. M.
12	135.6	1.59	S S W	0.8	79.7	☁ to 1, ☁ to 7 A. M., ☁ to 5, O to 11 P. M. T at 5 P. M. R at 12½ & from 4 to 10 P. M.
13	...	0.75	S S W & S W	0.2	130.3	O to 3, ☁ to 5 A. M., O to 11 P. M. R after intervals.
14	111.5	0.34	S W & W by S	...	170.3	O to 11 A. M., S to 5, O to 11 P. M. T & L from Midnight to 2 A. M. R from 2½ to 10 A. M. & 7 to 8 P. M.
15	136.0	2.16	S W & W by N	...	139.4	O to 11 A. M., ☉ to 7, O to 11 P. M. R from 1½ to 5, at 10½ A. M. & from 8 to 10½ P. M.
16	...	4.75	W S W	...	71.5	Chiefly O. R from 5½ to 8, 11 A. M. to 1 & 7½ to 11 P. M.
17	130.8	1.88	S & variable	..	67.6	O to 10 A. M., S to 2, O to 5, ☁ to 8, S to 11 P. M. T at Midnight & 1 A. M. L from Midnight to 2 at 5 A. M. & from 6½ to 11 P. M. R after intervals from Midnight to 4 P. M.
18	...	0.78	E & E S E	1.0	119.1	O to 2, S to 7, ☁ to 11 P. M. T at 11½ A. M. & 12 P. M. R from 5½ A. M. to 12 & at 10 P. M.
19	135.8	0.34	S E & S by E	...	149.6	O to 8, ☁ to 10 A. M., S to 4, ☁ to 7, S to 11 P. M. T at 2½ & 3½ P. M. Slight R after intervals.
20	136.4	0.12	S, & S S E	0.2	93.2	☁ & ☁ to 3, O to 7 A. M., ☁ & ☁ to 12, O to 3, S to 6, ☁ to 9, O to 11 P. M. T at 12½ P. M. L on N at 10 P. M. R from 1 to 3 P. M.
21	136.3	0.21	S E, S & S by E	...	88.6	O to 8, ☉ to 10 A. M., O to 2, ☉ to 7, B to 11 P. M. R at 6, 11½ A. M. & 2 P. M.

☁ Cirri, — i Strati, ☁ Cumuli, ☁ Cirro-strati, ☁ Cumulo-strati, ☁ Nimbi,
☁ Cirro-cumuli, B clear, S stratos, O overcast, T thunder, L lightning,
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1876.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	^o	Inches.		h	Miles	
22	140.9	1.63	S S E & S	0.3	80.0	B to 5, $\bar{\wedge}$ to 8, O to 10 A. M., $\bar{\wedge}$ to 1, O to 4, $\bar{\wedge}$ to 11 P. M. T after intervals from 9½ A. M. to 7 P. M. L at 7 P. M. R after intervals from 8 A. M. to 8½ P. M.
23	138.8	0.94	S S E & S E		80.0	$\bar{\wedge}$ to 2 A. M., $\bar{\wedge}$ to 1, O to 7, $\bar{\wedge}$ to 11 P. M. T & L at 3½ P. M. R from 2½ to 6½ P. M.
24	113.0	0.32	S E & S by E	...	80.8	O to 9 A. M., $\bar{\wedge}$ to 5, S to 11 P. M. T at 12½ P. M. Slight R after intervals from 5 to 9 A. M. at 12½ & 6½ P. M.
25	140.0	1.42	S by E, SE & E by N	0.7	68.9	B to 2, $\bar{\wedge}$ to 4, $\bar{\wedge}$ to 7 A. M., $\bar{\wedge}$ to 2, O to 5, S to 11 P. M. T, L & R from 2½ to 5½ P. M.
26	145.0	0.18	S E & S by E	4.0	90.3	$\bar{\wedge}$ to 8 A. M., $\bar{\wedge}$ to 2, O to 7, $\bar{\wedge}$ to 11 P. M. T from 2½ to 4½ P. M. R at 1½ & 3½ P. M.
27	142.5	0.26	S by E, E, & S	1.8	73.3	$\bar{\wedge}$ to 3, B to 7 A. M., $\bar{\wedge}$ to 8, $\bar{\wedge}$ to 11 P. M. T at 5 & 6 P. M. R at 12½ & 4 P. M.
28	141.0	...	S & S W	...	62.9	B to 7 A. M., $\bar{\wedge}$ to 7, $\bar{\wedge}$ & $\bar{\wedge}$ to 11 P. M. T at 5 P. M. Sheet L on E from 7½ to 11 P. M. D at 4½ P. M.
29	142.0	...	SW, SE & S by W	...	40.2	$\bar{\wedge}$ to 2, $\bar{\wedge}$ & $\bar{\wedge}$ to 7 A. M., $\bar{\wedge}$ to 11 P. M.
30	143.0	...	S by W	0.5	69.1	$\bar{\wedge}$ to 7 A. M., $\bar{\wedge}$ & $\bar{\wedge}$ to 8, $\bar{\wedge}$ to 11 P. M. T at 6½ P. M. L at 4 A. M., 6½ & 11 P. M.
31	142.0	0.02	S by W, NE & SE	...	62.5	$\bar{\wedge}$ to 6, $\bar{\wedge}$ to 10 A. M., $\bar{\wedge}$ to 3, O to 7, S to 11 P. M. T at 3 & 11 P. M. L from Midnight to 4 A. M. & 6½ to 11 P. M. R at 3, 7 & 11 P. M.

$\bar{\wedge}$ Cirri — i Strati, $\bar{\wedge}$ i Cumuli, $\bar{\wedge}$ i Cirro-strati, $\bar{\wedge}$ i Cumulo-strati, $\bar{\wedge}$ i Nimb, $\bar{\wedge}$ i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning, R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations,
taken at the Surveyor General's Office, Calcutta,
in the month of August 1876.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.613
Max. height of the Barometer occurred at 9 A. M. on the 28th ...	29.784
Min. height of the Barometer occurred at 5 P. M. on the 18th ...	29.396
Extreme range of the Barometer during the month	0.388
Mean of the daily Max. Pressures	29.670
Ditto ditto Min. ditto	29.548
Mean daily range of the Barometer during the month	0.123

	°
Mean Dry Bulb Thermometer for the month	83.0
Max. Temperature occurred at 3 P. M. on the 29th	92.0
Min. Temperature occurred at 5 A. M. & 10 P. M. on the 3rd & 15th ...	77.5
Extreme range of the Temperature during the month	14.5
Mean of the daily Max. Temperature	88.2
Ditto ditto Min. ditto,	79.7
Mean daily range of the Temperature during the month	8.5

Mean Wet Bulb Thermometer for the month	80.3
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	2.7
Computed Mean Dew-point for the month	78.4
Mean Dry Bulb Thermometer above computed mean Dew-point	4.6

	Inches.
Mean Elastic force of Vapour for the month	0.952

	Grain.
Mean Weight of Vapour for the month	10.21
Additional Weight of Vapour required for complete saturation ...	1.61
Mean degree of humidity for the month, complete saturation being unity	0.86

	°
Mean Max. Solar radiation Thermometer for the month	137.5

	Inches.
Rained 28 days.—Max. fall of rain during 24 hours	4.75
Total amount of rain during the month	24.85
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	23.53
Prevailing direction of the Wind S—S E & S S W	

* Height 70 feet 10 inches above ground.

Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of Aug. 1876.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1876.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.456	29.550	29.389	0.161	80.2	82.5	78 0	4.5
2	.587	.682	.508	.174	78.8	80.5	77.0	3.5
3	.675	.722	.631	.091	80.5	87 0	77.5	9.5
4	.675	.724	.618	.106	82.7	86 0	80 0	6.0
5	.690	.748	.622	.126	83.2	86.7	80.5	6.2
6	.719	.767	.657	.110	85.0	90.5	81.2	9.3
7	.720	.780	.663	.117	84.1	88.8	82 3	6 5
8	.676	.729	.617	.112	82 5	89.0	81.0	8.0
9	.656	.712	.586	.126	83 0	88 0	80.6	7.4
10	.652	.713	.578	.135	81 2	90.0	80.0	10.0
11	.644	.697	.561	.136	84.0	90.0	81.0	9.0
12	.611	.666	.533	.133	82 9	87.0	80.5	6.5
13	.609	.662	.540	.122	83.1	88 3	80.2	8.1
14	.653	.706	.587	.119	85.0	92 0	79.5	12.5
15	.685	.721	.634	.087	84.0	90.5	80 5	10.0
16	.715	.768	.671	.097	82.3	85 5	79.5	6.0
17	.723	.783	.615	.138	81.1	89.2	80.0	9.2
18	.726	.782	.671	.111	83.7	89.4	80 5	8.9
19	.764	.827	.707	.120	83.4	89.4	80.5	8.9
20	.773	.819	.700	.119	82.5	88.6	80.5	8.1
21	.704	.768	.626	.142	84.0	90.2	80.0	10.2
22	.663	.710	.613	.097	83.4	88.4	80.8	7.6
23	.702	.761	.652	.109	82.5	86.5	80.0	6.5
24	.753	.822	.701	.121	82.5	88.0	78.0	10.0
25	.775	.829	.712	.117	82.9	89.0	78.5	10.5
26	.777	.827	.709	.118	83.1	88 4	79.2	9.2
27	.814	.873	.773	.100	82 1	88.4	79.0	9.4
28	.859	.916	.796	.120	82.2	88.8	78.9	9.9
29	.881	.949	.792	.157	83.1	88 0	78.5	9.5
30	.826	.898	.744	.154	83.2	88.7	78.8	9.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1876.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	Gr.	Gr.	
1	78.6	1.6	77.5	2.7	0.925	9.98	0.90	0.92
2	77.9	0.9	77.3	1.5	.919	.91	.50	.95
3	79.0	1.5	77.9	2.6	.937	10.10	.88	.92
4	80.6	2.1	79.1	3.6	.973	.45	1.27	.84
5	80.6	2.6	78.8	4.4	.961	.36	.53	.87
6	81.3	3.7	78.7	6.3	.961	.20	2.24	.82
7	81.4	2.7	79.5	4.6	.986	.55	1.66	.86
8	80.7	1.8	79.4	3.1	.983	.56	.08	.91
9	80.8	2.2	79.3	3.7	.979	.51	.31	.89
10	80.9	3.3	78.6	5.6	.958	.26	.08	.84
11	80.8	3.2	78.6	5.4	.958	.28	.89	.85
12	80.3	2.6	78.5	4.4	.955	.27	.52	.87
13	80.4	2.7	78.5	4.6	.955	.25	.61	.86
14	80.3	4.7	77.0	8.0	.910	9.73	2.80	.78
15	80.5	3.5	78.0	6.0	.910	10.07	.10	.83
16	79.9	2.4	78.2	4.1	.946	.17	1.41	.88
17	81.0	3.1	78.8	5.3	.961	.34	.87	.85
18	80.9	2.8	78.9	4.8	.967	.37	.70	.86
19	80.7	2.7	78.8	4.6	.964	.31	.62	.87
20	80.3	2.2	78.8	3.7	.964	.36	.28	.89
21	80.9	3.1	78.7	5.3	.961	.31	.86	.85
22	80.7	2.7	78.8	4.6	.964	.31	.62	.87
23	80.3	2.2	78.8	3.7	.964	.36	.28	.89
24	79.9	2.6	78.1	4.4	.943	.14	.50	.87
25	79.5	3.4	77.1	5.8	.913	9.80	.99	.83
26	80.0	3.1	77.8	5.3	.934	10.03	.63	.85
27	79.3	2.6	77.3	4.8	.919	9.88	.63	.86
28	79.2	3.0	77.1	5.1	.918	.82	.72	.85
29	79.4	3.7	76.8	6.3	.905	.71	2.15	.82
30	78.6	4.6	75.4	7.8	.863	.28	.61	.78

All the Hygrometrical elements are computed by the Greenwich Observatory.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1876.*

**Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.**

Hour	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max	Min.	Diff.
	Inches.	Inches	Inches	Inches	°	°	°	°
Mid- night	29.718	29.895	29.491	0.404	81.1	83.0	78.0	5.0
1	.707	.885	.465	.420	80.9	82.8	78.1	4.7
2	.695	.880	.458	.422	80.6	82.8	77.7	5.1
3	.686	.879	.450	.429	80.1	82.6	77.5	5.1
4	.680	.878	.442	.436	80.2	82.5	77.5	5.0
5	.693	.888	.446	.442	80.1	82.5	77.5	5.0
6	.707	.905	.453	.452	80.0	82.3	77.0	5.3
7	.726	.921	.453	.468	80.6	82.8	77.8	5.0
8	.745	.940	.454	.486	82.3	81.7	78.4	6.3
9	.754	.949	.462	.447	81.0	86.2	79.5	6.7
10	.754	.949	.488	.461	83.7	88.0	80.5	7.5
11	.743	.933	.464	.469	86.4	89.4	79.2	10.2
Noon	.725	.911	.457	.454	86.7	90.7	80.5	10.2
1	.698	.873	.414	.429	86.8	91.5	79.8	11.7
2	.673	.843	.423	.420	86.4	92.0	77.5	14.5
3	.654	.820	.400	.420	85.7	91.6	78.2	13.4
4	.646	.802	.393	.409	85.4	92.0	79.0	13.0
5	.651	.809	.389	.420	84.2	87.8	79.5	8.3
6	.664	.826	.399	.427	83.4	86.5	79.5	7.0
7	.687	.865	.440	.425	82.8	85.4	79.5	5.9
8	.712	.881	.484	.397	82.3	81.7	78.5	6.2
9	.733	.898	.509	.389	81.9	84.0	78.5	5.5
10	.742	.909	.532	.377	81.6	83.5	78.5	5.0
11	.738	.900	.550	.350	81.3	83.5	78.0	5.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon — (Continued)

Hour	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point	Dry Bulb above Dew Point.	Mean Elastic force of Vapour	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation	Mean degree of Humi- dity complete satura- tion being unity.
	°	°	°	°	Inches	Gr.	Gr.	
Mid- night	79.6	15	78.5	2.6	0.955	10.29	0.88	0.92
1	79.5	14	78.5	2.4	.955	.31	.79	.93
2	79.3	13	78.4	2.2	.952	.27	.74	.93
3	79.2	12	78.4	2.0	.952	.27	.67	.94
4	79.1	11	78.3	1.9	.949	.21	.61	.94
5	79.0	11	78.2	1.9	.946	.21	.63	.94
6	79.0	10	78.3	1.7	.949	.24	.57	.95
7	79.6	10	78.9	1.7	.967	.43	.58	.95
8	80.3	20	78.9	3.4	.967	.41	1.17	.90
9	80.9	31	78.7	5.3	.961	.31	.86	.85
10	81.3	44	78.2	7.5	.946	.09	2.71	.79
11	81.3	51	77.7	8.7	.931	9.92	3.14	.76
Noon	81.2	5.5	77.9	8.8	.937	.98	.20	.76
1	81.3	5.5	78.0	8.8	.940	10.01	.20	.76
2	81.1	5.3	77.4	9.0	.922	9.83	.23	.75
3	80.7	5.0	77.2	8.5	.916	.77	.03	.76
4	80.6	4.8	77.2	8.2	.916	.79	2.89	.77
5	80.5	3.7	77.9	6.3	.937	10.04	.20	.82
6	80.3	3.1	78.1	5.3	.943	.12	1.84	.85
7	80.4	2.4	78.7	4.1	.961	.33	.42	.88
8	80.1	2.2	78.6	3.7	.958	.30	.28	.89
9	79.9	2.0	78.5	3.4	.955	.29	.15	.90
10	79.7	1.9	78.4	3.2	.952	.25	.09	.90
11	79.6	1.7	78.4	2.9	.952	.25	0.99	.90

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.		General aspect of the Sky.
			Prevailing direction.	Max. Pressure. Daily Velocity.	
	°	Inches		lb Miles.	
1	...	1.83	E & S E	1.7 157.6	O to 3, \i to 6, O to 11 P. M. T at Midnight. L at Midnight & 1 A. M. R nearly the whole day.
2	...	1.18	S E & S S E	0.2 217.8	O. T at 4½ A. M. R after in- tervals.
3	138.2	1.16	S by E & S	1.3 121.0	O to 9 A. M., \i to 12, O to 11 P. M. T & L at 2 & 3 A. M. R from Midnight to 7 A. M., 12½ to 3 & 5 to 7½ P. M.
4	125.0	...	S by E & S S W [& S S E	... 95.0	\i & \i to 7, O to 9 A. M., S to 9, \i to 11 P. M.
5	139.2	...	S by E, S S W	... 59.8	\i to 8 A. M., \i to 1, S to 9, \i to 11 P. M. T at 3½ & 4 P. M.
6	142.0	...	S S E & S	... 41.4	\i to 8 A. M., \i to 6, O to 8, \i to 11 P. M. T & L at 6 & 7 P. M. D at 7 P. M.
7	139.0	0.64	S S E & S by W	.. 23.6	S to 4, \i to 7 A. M., \i to 4, O to 7, \i to 11 P. M. T at 3½, 6 & 7 P. M. L from 6½ to 8 P. M. Rain from 10½ A. M. to 12 & 2½ to 7 P. M.
8	136.2	2.01	S by W & S	... 30.4	\i to 8, \i to 11 A. M., O to 1, \i to 3, O to 5, \i to 11 P. M. T from 11½ A. M. to 1 & at 3½ P. M.
9	136.5	0.94	S W & Variable	... 34.0	\i to 1, \i to 6, \i & \i to 11 A. M., \i to 3, O to 6, \i to 11 P. M. T at 3½ & 4½ P. M. R at 4 P. M.
10	142.0	...	S W, E by S & S [by W	... 32.0	\i to 7 A. M., \i to 4, S to 11 P. M. T at 3½ P. M. Sheet L from 7 to 9 P. M.
11	146.0	...	E & S	1.2 59.8	\i & \i to 6, \i to 9 A. M., \i to 2, S to 6, \i to 11 P. M. L at 7, 8 & 11 P. M. D at 3 & 4 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbri,
\i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches.		lb	Miles.	
12	136.0	0.04	E & S E	0.8	136.6	B to 5. Scuds to 9 A. M., \curvearrowright to 6, B to 11 P. M., T at 11½ A. M., 12 & 3 P. M. Sheet L on W at 8 & 9 P. M. Light R at 10½ A. M. & 3 P. M.
13	148.0	0.21	E S E, E & S E	0.4	108.1	B to 3. S to 10 A. M., \curvearrowright to 12, \curvearrowright to 7, B to 11 P. M., T at 3½, 4½ & 5½ P. M. Sheet L on N W from 7 to 10 P. M. R from 4 to 5½ P. M.
14	141.0	...	E & S E	1.2	102.7	\curvearrowright & \curvearrowright to 9 A. M., \curvearrowright to 12, \curvearrowright to 7, B to 11 P. M. Sheet L on N W at 11 P. M.
15	...	0.16	E by S & S E	2.0	108.4	B to 4, \curvearrowright to 8, \curvearrowright to 10 A. M., \curvearrowright to 4, \curvearrowright to 6, \curvearrowright to 8, B to 11 P. M. T at 2 P. M. R at 2½ P. M.
16	...	0.86	E S E & S E	1.0	145.8	B to 1, S to 8, \curvearrowright to 11 A. M., O to 3, S to 7, B to 11 P. M. T at 3½ P. M. R at 3½, 4½ A. M., 12 & 3 P. M.
17	Out of order.	0.10	E by S & S	...	105.1	B to 4, \curvearrowright to 8 A. M., \curvearrowright to 7, B to 11 P. M. T at 1½ P. M. Slight R after intervals from 9½ A. M. to 4½ P. M.
18		0.07	S by E, SE & SSE	...	102.0	B to 1, \curvearrowright to 7 A. M., \curvearrowright to 4, \curvearrowright to 7, B to 11 P. M. T at 2 P. M. Sheet L at Midnight & 1 A. M. Slight R after intervals from 12½ to 4½ P. M.
19		0.31	S & S S E	0.4	58.0	B to 6 A. M., \curvearrowright to 11 P. M. T from 12½ to 3 P. M. L at 9 & 10 P. M. R from 1½ to 3½ & at 7½ P. M.
20		0.06	S & S by W	1.6	87.0	S to 5 A. M., \curvearrowright & \curvearrowright to 12, O to 6, Scuds to 9, B to 11 P. M. T from 11½ A. M. to 1 P. M., Sheet L on W at 5 A. M., Light R at 12½ P. M.

\curvearrowright Cirri, —i Strati, \curvearrowright Cumuli, \curvearrowright Cirro-strati, \curvearrowright Cumulo-strati, \curvearrowright Nimbi,
 \curvearrowright Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1876.*

Solar Radiation, Weather, &c..

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches.		lb	Miles.	
21	Out of order.	...	S by W & S	...	60.9	B to 5, \i to 8 A. M., \i to 8, \i to 9, B to 11 P. M.
22		...	S & S by E	...	91.8	B to 5, \i to 8 A. M., \i to 8, O to 6, \i to 8, B to 11 P. M. Sheet L at 7 & 11 P. M. D at 11 A. M.
23		0.06	SSE, SE & S by E	...	139.1	\i to 1, O to 5, \i to 9, \i to 11 A. M., S to 7, \i to 9, B to 11 P. M. Light R at 12 P. M.
24		0.42	S & W S W	...	107.1	O to 5, \i to 9 A. M., \i to 1, S to 8, O to 11 P. M. T at 10 P. M. L from 6½ to 10 P. M. R at 1, 3½ A. M., 9½, 10½ & 11 P. M.
25		0.04	SSE, W by S & SW	...	62.1	O to 1, S to 6 A. M., \i to 9, \i & \i to 11 P. M. Sheet L on W at 2 A. M. Light R at Midnight & 9 P. M.
26		...	W S W & S	...	45.5	\i to 2, \i to 7, O to 10 A. M., \i to 4, S to 11 P. M. Sheet L from 6 to 11 P. M. D at 7 P. M.
27		0.16	NNW, S & ESE	..	80.4	B to 5, \i to 10 A. M., \i to 1, O to 3, \i to 9, B to 11 P. M. T at 1 & 3 P. M. Sheet L at 1½ A. M. & from 7 to 9 P. M. Slight R at 1 A. M., 2, 5, 7½ & 8 P. M.
28		0.02	E S E & S	1.3	77.9	B to 3, \i to 9 A. M., \i to 5, \i to 7, B to 11 P. M. Light R at 5 P. M.
29		...	S & S by W	...	98.9	B to 7 A. M., \i to 4, \i to 11 P. M. T at 12½ P. M. D at 12 P. M.
30		...	S by W & S	0.2	97.2	\i & \i to 2, B to 7 A. M., \i to 4, \i to 6, \i to 8, \i to 11 P. M. D at 11½ P. M.

\i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,
B clear, S stratoni, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1876.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29 705
Max. height of the Barometer occurred at 9 & 10 A. M. on the 29th ...	29 919
Min. height of the Barometer occurred at 5 P. M. on the 1st ...	29 389
Extreme range of the Barometer during the month	0 560
Mean of the daily Max. Pressures	29 764
Ditto ditto Min. ditto	29 641
Mean daily range of the Barometer during the month	0.123

	°
Mean Dry Bulb Thermometer for the month	82.9
Max. Temperature occurred at 2 & 4 P. M. on the 11th	92.0
Min. Temperature occurred at 6 A. M. on the 2nd	77.0
Extreme range of the Temperature during the month	15.0
Mean of the daily Max. Temperature	88.1
Ditto ditto Min. ditto,	79.8
Mean daily range of the Temperature during the month	8.3

Mean Wet Bulb Thermometer for the month	80.1
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	2.8
Computed Mean Dew-point for the month	78.1
Mean Dry Bulb Thermometer above computed mean Dew-point	4.8

	Inches.
Mean Elastic force of Vapour for the month	0.943

	Grain.
Mean Weight of Vapour for the month	10.12
Additional Weight of Vapour required for complete saturation ...	1.67
Mean degree of humidity for the month, complete saturation being unity	0.86

	°
Mean Max. Solar radiation Thermometer for the month	139.1

	Inches.
Rained 25 days.—Max. fall of rain during 24 hours	2.01
Total amount of rain during the month	10.26
Total amount of rain indicated by the Gauge* attached to the anemometer during the month	8.91
Prevailing direction of the Wind S, S by E & S S E	

* Height 70 feet 10 inches above ground.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1816.*

Latitude 22° 33' 1" North. Longitude 88° 20' 31" East.

Height of the Cistern of the Standard Barometer above the sea level, 18 11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches	Inches	o	o	o	o
1	29.751	29.807	29.686	0.121	82.7	87.7	79.3	8.4
2	.803	.819	.753	.066	82.8	88.0	80.0	8.0
3	.852	.911	.815	.096	82.1	85.7	80.7	5.0
4	.850	.904	.785	.119	83.3	88.5	79.1	9.1
5	.857	.919	.797	.122	81.3	89.8	79.7	10.1
6	.858	.911	.819	.122	80.7	83.5	77.0	6.5
7	.810	.866	.743	.123	78.4	79.8	76.8	3.0
8	.726	.786	.666	.120	79.9	81.0	75.8	5.2
9	.665	.728	.595	.133	81.7	87.5	77.0	10.5
10	.702	.821	.601	.220	79.3	82.0	77.4	4.6
11	.866	.983	.786	.147	78.5	83.2	74.5	8.7
12	.908	.960	.853	.107	80.1	84.8	76.2	8.6
13	.901	.957	.845	.112	79.8	81.5	77.0	7.5
14	.913	.970	.869	.101	79.7	84.5	74.5	10.0
15	.942	.998	.881	.117	81.2	87.5	75.8	11.7
16	.975	30.039	.924	.115	81.1	86.6	76.0	10.6
17	.992	.062	.935	.127	80.9	87.0	75.5	11.5
18	.979	.051	.931	.120	81.3	87.0	76.5	10.5
19	.964	.032	.905	.127	81.4	87.5	77.0	10.5
20	.970	.037	.917	.120	79.5	86.2	74.5	11.7
21	.975	.030	.931	.099	78.5	84.0	74.0	10.0
22	.967	.027	.923	.104	78.0	84.4	72.0	12.4
23	.966	.032	.907	.125	77.8	84.3	72.5	11.8
24	.970	.031	.921	.110	77.4	83.5	72.7	10.8
25	.962	.023	.908	.115	77.5	84.6	70.5	14.1
26	.953	.020	.882	.138	77.8	84.5	72.0	12.5
27	.920	29.988	.861	.127	77.8	84.2	72.5	11.7
28	.901	.952	.854	.098	77.7	84.8	71.5	13.3
29	.903	.969	.834	.135	78.5	86.0	72.0	14.0
30	.863	.914	.806	.108	77.9	81.5	75.8	6.3
31	.708	.820	.558	.262	73.8	76.5	70.5	6.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1876.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic Foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	Gr.	Gr.	
1	79.3	3.4	76.9	5.8	0.909	9.74	1.98	0.83
2	79.1	3.7	76.5	6.3	.806	.63	2.12	.82
3	79.2	2.9	77.2	4.9	.916	.85	1.66	.86
4	80.1	3.2	77.9	5.4	.937	10.06	.87	.84
5	80.2	4.1	77.3	7.0	.919	9.84	2.44	.80
6	78.4	2.3	76.8	3.9	.905	.75	1.20	.88
7	77.3	1.1	76.5	1.9	.806	.71	0.60	.94
8	78.2	1.7	77.0	2.9	.910	.83	.95	.91
9	77.9	3.8	75.2	6.5	.860	.24	2.13	.81
10	76.9	2.4	75.2	4.1	.860	.30	1.29	.88
11	76.9	2.6	74.1	4.4	.830	.00	.35	.87
12	77.0	3.1	74.8	5.3	.849	.17	.67	.86
13	76.8	3.0	74.7	5.1	.816	.11	.61	.85
14	75.5	4.2	72.6	7.1	.790	8.53	2.19	.80
15	76.5	4.7	73.2	8.0	.806	.68	.53	.77
16	76.3	4.8	72.9	8.2	.797	.59	.58	.77
17	75.8	5.1	72.2	8.7	.781	.40	.70	.76
18	76.4	4.9	73.0	8.3	.801	.62	.62	.77
19	76.1	5.3	72.4	9.0	.785	.45	.82	.75
20	74.2	5.3	70.5	9.0	.739	7.98	.68	.75
21	71.8	6.7	67.1	11.4	.661	.16	3.19	.69
22	71.2	6.8	66.4	11.6	.616	.00	.19	.69
23	71.4	6.4	66.9	10.9	.657	.12	.01	.70
24	71.4	6.0	67.2	10.2	.664	.20	2.81	.72
25	70.6	6.9	65.8	11.7	.634	0.87	3.17	.68
26	71.4	6.4	66.9	10.9	.657	7.12	.01	.70
27	71.9	5.9	67.8	10.0	.677	.33	2.80	.72
28	71.8	5.9	67.7	10.0	.674	.31	.79	.72
29	72.5	6.0	68.3	10.2	.688	.45	.90	.72
30	74.1	3.8	71.4	6.5	.761	8.23	1.93	.81
31	71.2	2.6	69.4	4.4	.713	7.80	.18	.87

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1876.*

**Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.**

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches	Inches	Inches	°	°	°	°
Mid- night	29.895	29.995	29.659	0.336	77.7	83.0	74.0	9.0
1	.882	.988	.622	.366	77.3	82.5	73.5	9.0
2	.870	.979	.610	.369	77.0	82.0	73.0	9.0
3	.859	.968	.608	.360	76.6	81.5	72.5	9.0
4	.858	.965	.601	.364	76.2	81.2	72.0	9.2
5	.872	.989	.622	.367	75.9	81.0	71.0	10.0
6	.890	30.002	.651	.351	75.7	81.0	70.5	10.5
7	.908	.027	.681	.316	76.2	81.9	71.5	10.4
8	.928	.052	.708	.311	78.2	83.3	74.5	8.8
9	.939	.062	.715	.317	80.2	85.5	75.2	10.3
10	.938	.060	.705	.355	81.9	87.7	76.0	11.7
11	.924	.043	.688	.355	82.7	88.2	76.5	11.7
Noon	.900	.021	.658	.363	83.0	89.8	75.5	14.3
1	.872	29.998	.633	.365	83.8	88.8	74.6	14.2
2	.819	.967	.607	.360	81.2	89.6	74.0	15.6
3	.837	.955	.595	.360	81.2	88.6	72.5	16.1
4	.831	.935	.598	.337	83.7	88.5	71.6	16.9
5	.839	.937	.611	.326	82.9	88.5	71.5	17.0
6	.848	.955	.610	.315	81.2	85.5	71.0	14.5
7	.867	.965	.615	.350	80.3	84.8	71.0	13.8
8	.884	30.000	.580	.420	79.4	81.3	70.5	13.8
9	.896	.019	.558	.461	78.8	84.0	70.5	13.5
10	.900	.000	.570	.430	78.3	83.5	70.8	12.7
11	.897	.001	.561	.440	77.9	83.0	71.0	12.0

**The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.**

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1876.**

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	Gr.	Gr.	
Mid- night	75.3	2.4	73.6	4.1	0.817	8.86	.124	0.88
1	75.0	2.3	73.1	3.9	.811	.80	.18	.88
2	74.9	2.2	73.3	3.7	.809	.77	.12	.89
3	74.6	2.0	73.2	3.4	.806	.77	.00	.91
4	74.3	1.9	73.0	3.2	.801	.71	0.05	.90
5	74.1	1.8	72.8	3.1	.795	.66	.91	.91
6	74.0	1.7	72.8	2.9	.795	.66	.85	.91
7	74.4	1.8	73.1	3.1	.803	.74	.92	.91
8	75.3	2.0	73.3	4.9	.809	.75	1.50	.85
9	75.8	4.1	72.7	7.5	.792	.54	2.34	.79
10	76.1	5.8	72.0	9.9	.776	.33	3.11	.73
11	76.2	6.5	71.6	11.1	.766	.22	.50	.70
Noon	75.7	7.3	70.6	12.4	.741	7.95	.87	.67
1	75.9	7.9	70.4	13.1	.736	.89	4.21	.65
2	75.9	8.3	70.1	11.1	.729	.81	.43	.64
3	75.5	8.7	69.4	14.8	.713	.62	.62	.62
4	75.6	8.1	69.9	13.8	.725	.76	.31	.64
5	75.7	7.2	70.7	12.2	.744	.98	3.81	.68
6	76.1	5.1	72.5	8.7	.787	8.47	2.74	.76
7	76.3	4.0	73.5	6.8	.814	.78	.13	.81
8	75.9	3.5	73.4	6.0	.811	.76	1.86	.83
9	75.5	3.3	73.2	5.6	.806	.71	.73	.83
10	75.4	2.9	73.4	4.9	.811	.78	.50	.85
11	75.3	2.6	73.5	4.4	.814	.83	.33	.87

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches		lb.	Miles.	
1	S by W & S S W	...	182.9	¶ i & ¶ i to 10 A. M., ¶ i to 11 P. M. T from 8 to 10½ P. M. L from 6½ to 9 P. M. D at 9 P. M.
2	[& E by N S S E, W N W	...	83.9	¶ i to 3, O to 6, ¶ i to 10 A. M. ¶ i to 4, ¶ i to 7, ¶ i to 11 P. M.
3	...	0.03	E by N, N & N W	...	88.5	¶ i to 8 A. M., ¶ i to 1, O to 4, S to 6, ¶ i to 11 P. M. T at 2 P. M. Light R at 10½ A. M. & 2½ P. M.
4	...	0.71	N W & N N E	...	66.3	¶ i to 8, ¶ i to 11 A. M. O to 1, ¶ i to 6, B to 8, ¶ i to 11 P. M. T at 12½ P. M. R at 12 & 1 P. M.
5	N N E & E	...	69.0	¶ i to 9 A. M., ¶ i to 5, ¶ i to 7, S to 11 P. M. Sheet L on E from 6½ to 9 P. M. D at 3½ P. M.
6	...	0.35	E & S	1.2	82.6	¶ i to 8, S to 10 A. M. O to 11 P. M. R between 11 A. M. & 12, & from 4 to 9½ P. M.
7	...	1.59	E N E & E	...	63.8	Chiefly O T at 10½ A. M. R nearly the whole day.
8	Out of order.	1.10	E by N & E	C.4	155.4	O to 5, ¶ i to 10 A. M. S to 12, ¶ i to 6, O to 11 P. M. T at 4 & 10½ A. M. L on W at 8 P. M. R after intervals.
9	E S E & S E	1.0	143.4	¶ i to 1, ¶ i to 5, O to 11 P. M. Sheet L between 7 & 8 P. M. R at 11 P. M.
10	...	0.62	S S E & S	2.2	306.2	O to 6, ¶ i to 9 A. M. S to 5, O to 11 P. M. T between Mid-night & 1 A. M. L at 1½ A. M. R at Midnight 2, 3, 5½ & 10 A. M.
11	...	0.42	S E & Variable	...	147.6	O to 10 A. M., ¶ i to 1, ¶ i to 6, B to 11 P. M. R from 2 to 7½ A. M.
12	...	0.10	S E & S S W	...	41.7	B to 2, ¶ i to 10 A. M., ¶ i to 7, B to 11 P. M. R at 11 A. M.
13	S S W & S by W	...	37.1	B to 2, ¶ i to 7, S to 10 A. M., ¶ i to 6, ¶ i to 11 P. M. D at 12½ P. M.

¶ i Cirri, — i Strati, ¶ i Cumuli, ¶ i Cirro-strati, ¶ i Cumulo-strati, ¶ i Nimbi,
¶ i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning.
E. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity	
	°	Inches		lb.	Miles.	
14	...	0.44	W by S & S W	...	70.2	B to 1, ci to 4, ci to 11 A. M., B to 11 P. M. R between 3 & 4 A. M.
15	S W & S S W	...	54.2	B to 8 A. M., ci to 1, ci to 4, B to 11 P. M.
16	S S W & S W	...	47.8	B to 10 A. M., ci to 4, B to 11 P. M.
17	S W & S S W	...	40.5	B to 8, ci to 11 A. M., B to 4, ci to 7, B to 11 P. M. Sheet L on W at 7 P. M.
18	S S W & W	...	36.5	B to 7, ci to 10 A. M., ci to 4, B to 11 P. M. Slightly foggy at 9 P. M.
19	...	0.04	W & S W	...	44.4	B to 9 A. M., ci to 6, S to 11 P. M. Light R between 7 & 8 P. M.
20	N by E & N by W	...	68.3	B to 10 A. M., ci to 4, B to 11 P. M.
21	N by W & N N W	...	91.3	B to 10 A. M., ci to 5, B to 11 P. M.
22	N N W & N by E	...	101.1	B to 10 A. M., ci to 4, ci to 6 B to 11 P. M.
23	N N W & N by W	...	120.2	B to 10 A. M., ci to 4, B to 11 P. M.
24	N by W & W N W	...	63.2	B to 4, ci to 6 A. M., ci to 8, B to 11 P. M.
25	W N W & N N W	...	72.1	B to 10 A. M., ci & ci to 4, B to 11 P. M. Slightly foggy at 6 & 7 A. M.
26	N W & W by N	...	45.4	B to 10 A. M., ci to 5, B to 11 P. M. Slightly foggy from 8 to 11 P. M.
27	W by N & W N W	...	34.7	B to 9 A. M., ci to 5, B to 11 P. M. Slightly foggy from 8 to 10 P. M.
28	W N W & N N W	...	26.3	B to 5, ci to 11 A. M., ci to 4, ci to 6, B to 9, ci to 11 P. M. Slightly foggy from 9 to 11 P. M.

ci Cirri, —i Strati, ci Cumuli, ci Cirro-strati, ci Cumulo-strati, ci Nimbi, ci Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning, R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1876.*

Solar Radiation, Weather, &c..

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches.		lb	Miles	
29	Out of order. °	...	N N W & N by W [E by N]	...	21.0	~i to 2, S to 6 A. M., ~i to 11 P. M.
30	...	...	N by W, S S E &	...	42.7	~i to 1, S to 7, O to 11 A. M., ~i to 4, O to 11 P. M. D at 11½ A. M.
31	Out of order.	0.40	N E	12.0	215.7	O. High wind from 11½ A. M. to 11 P. M. Slight R from 4 A. M. to 11 P. M.

~i Cirri — i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,
~i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1876.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ...	29.883
Max. height of the Barometer occurred at 9 A. M. on the 17th...	30.062
Min. height of the Barometer occurred at 9 P. M. on the 31st ...	29.658
Extreme range of the Barometer during the month ...	0.504
Mean of the daily Max. Pressures ...	29.948
Ditto ditto Min. ditto ...	29.822
Mean daily range of the Barometer during the month ...	0.126

	°
Mean Dry Bulb Thermometer for the month ...	79.7
Max. Temperature occurred at Noon on the 5th ...	89.8
Min. Temperature occurred at 6 A. M. 8 & 9 P. M. on the 25th & 31st ...	70.5
Extreme range of the Temperature during the month ...	19.3
Mean of the daily Max. Temperature ...	85.0
Ditto ditto Min. ditto, ...	75.4
Mean daily range of the Temperature during the month ...	9.6

Mean Wet Bulb Thermometer for the month ...	75.4
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	4.3
Computed Mean Dew-point for the month ...	72.4
Mean Dry Bulb Thermometer above computed mean Dew-point ...	7.3

	Inches.
Mean Elastic force of Vapour for the month ...	0.785

	Grain.
Mean Weight of Vapour for the month ...	8.48
Additional Weight of Vapour required for complete saturation ...	2.24
Mean degree of humidity for the month, complete saturation being unity	0.79

Mean Max. Solar radiation Thermometer for the month ...	Out of order
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	Inches.
Rained 16 days,—Max. fall of rain during 24 hours ...	1.59
Total amount of rain during the month ...	5.80
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ...	5.09
Prevailing direction of the Wind ... S S W, S W & N N W	

* Height 70 feet 10 inches above ground.

*Abstract of the Results of the Hourly Meteorological Observations
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in the month of November 1876.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.722	29.853	29.514	0.339	75.0	82.4	72.0	10.4
2	.896	.961	.840	.121	77.1	84.0	71.0	13.0
3	.937	30.005	.894	.111	77.1	83.4	72.0	11.4
4	.946	.006	.900	.106	76.4	83.6	71.0	12.6
5	.956	.025	.904	.121	74.8	82.7	68.0	14.7
6	.929	29.987	.876	.111	74.5	81.7	68.0	13.7
7	.952	30.003	.902	.101	74.5	83.0	66.7	16.3
8	.977	.048	.934	.114	74.8	82.0	67.2	14.8
9	.957	.025	.897	.128	75.2	82.7	68.5	14.2
10	.903	29.960	.820	.140	75.6	82.0	70.5	11.5
11	.909	.978	.858	.120	75.4	83.7	69.5	14.2
12	.936	.991	.891	.100	74.8	83.8	67.0	15.9
13	.932	30.061	.872	.129	73.5	82.0	66.7	15.3
14	.855	29.926	.783	.148	73.2	80.8	68.0	12.8
15	.852	.918	.797	.121	72.5	80.3	66.0	14.3
16	.939	30.010	.888	.122	71.4	79.5	64.0	15.5
17	.967	.031	.900	.131	71.7	80.5	63.0	16.6
18	.967	.047	.902	.145	72.6	81.5	65.0	16.5
19	.959	.034	.889	.145	73.2	82.8	65.5	17.3
20	.978	.042	.926	.116	73.0	81.0	66.0	15.0
21	30.014	.098	.938	.160	73.0	81.0	66.5	14.5
22	29.972	.040	.906	.134	73.2	81.2	65.0	16.2
23	.845	29.927	.779	.148	71.9	71.5	69.5	5.0
24	.830	.920	.768	.162	70.3	73.5	66.7	6.8
25	.982	30.034	.856	.178	71.9	75.2	69.8	5.4
26	30.008	.080	.946	.134	72.8	80.5	68.0	12.5
27	.005	.081	.959	.122	74.0	81.7	69.2	12.5
28	.028	.093	.969	.124	71.0	79.5	65.5	14.0
29	.023	.096	.957	.139	68.3	77.0	61.5	15.5
30	.009	.081	.921	.150	67.1	76.5	59.8	16.7

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November 1876.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	Gr.	Gr.	
1	71.3	4.6	68.1	7.8	0.684	7.43	2.14	0.78
2	72.0	5.1	68.4	8.7	.690	.48	.44	.75
3	71.9	5.2	68.3	8.8	.688	.46	.46	.75
4	70.7	5.7	66.7	9.7	.653	.09	.63	.73
5	67.9	6.9	63.1	11.7	.580	6.31	.95	.68
6	67.0	7.5	61.7	12.8	.554	.03	3.15	.66
7	67.6	6.9	62.8	11.7	.574	.26	2.92	.68
8	67.9	6.9	63.1	11.7	.580	.31	.95	.68
9	68.6	6.6	64.0	11.2	.597	.50	.87	.69
10	69.8	5.8	65.7	9.9	.632	.88	.60	.73
11	68.1	7.3	63.0	12.4	.578	.30	3.13	.67
12	67.4	7.4	62.2	12.6	.563	.13	.13	.66
13	66.1	7.4	60.9	12.6	.539	5.88	.02	.66
14	66.9	6.3	61.9	11.3	.557	6.09	2.73	.69
15	65.4	7.1	59.7	12.8	.518	5.67	.96	.66
16	64.2	7.2	58.4	13.0	.496	.43	.92	.65
17	65.1	6.6	59.8	11.9	.520	.69	.74	.68
18	66.3	6.3	61.3	11.3	.546	.99	.67	.69
19	66.2	7.0	60.6	12.6	.534	.83	.99	.66
20	65.3	7.7	59.1	13.9	.508	.55	3.21	.63
21	65.0	8.0	58.6	14.4	.499	.46	.30	.62
22	66.1	7.1	60.4	12.8	.530	.80	.02	.66
23	69.5	2.4	67.6	4.3	.672	7.38	1.10	.87
24	68.6	1.7	67.2	3.1	.664	.31	0.77	.91
25	70.1	1.8	68.7	3.2	.697	.64	.84	.90
26	70.0	2.8	67.8	5.0	.677	.41	1.30	.85
27	68.6	5.4	64.8	9.2	.613	6.71	2.33	.74
28	63.5	7.5	57.5	13.5	.481	5.28	.97	.64
29	60.3	8.0	53.9	14.4	.426	4.71	.89	.62
30	60.0	7.1	54.3	12.8	.432	.78	.54	.65

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
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in the month of November 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.937	30.053	29.528	0.525	70.3	74.4	63.6	10.8
1	.927	.030	.514	.516	69.7	74.0	63.2	10.8
2	.918	.024	.523	.501	69.2	73.1	63.0	10.1
3	.909	.009	.553	.456	68.7	72.9	62.0	10.9
4	.910	.007	.597	.410	68.2	72.6	60.5	12.1
5	.925	.020	.640	.380	67.7	72.5	60.0	12.5
6	.943	.035	.682	.353	67.4	72.5	60.0	12.5
7	.963	.060	.712	.348	67.6	72.5	59.8	12.7
8	.985	.085	.748	.337	70.3	76.1	61.0	15.1
9	30.003	.098	.782	.316	73.3	77.5	64.8	12.7
10	.001	.093	.791	.302	75.7	80.0	68.2	11.8
11	29.981	.076	.797	.279	77.5	82.0	70.0	12.0
Noon.	.953	.050	.776	.274	78.9	83.0	71.5	11.5
1	.921	.008	.753	.255	80.0	84.0	72.8	11.2
2	.900	29.981	.742	.239	80.6	84.0	73.3	10.7
3	.889	.971	.738	.233	80.6	84.0	73.5	10.5
4	.887	.969	.746	.223	79.4	83.3	73.4	9.9
5	.897	.980	.751	.229	78.0	82.5	72.6	9.9
6	.912	30.000	.777	.223	75.8	79.5	70.0	9.5
7	.929	.018	.792	.226	74.3	78.5	68.4	10.1
8	.947	.035	.806	.229	73.1	77.0	67.0	10.0
9	.959	.050	.814	.236	72.3	76.2	66.2	10.0
10	.967	.062	.826	.236	71.4	75.5	65.0	10.5
11	.961	.065	.818	.247	70.7	75.0	64.0	11.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	Gr.	Gr.	
Mid- night.	67.0	3.3	64.4	5.9	0.605	6.66	1.42	0.82
1	66.3	3.1	64.1	5.6	.599	.59	.34	.83
2	66.2	3.0	63.8	5.4	.593	.51	.27	.84
3	65.8	2.9	63.5	5.2	.588	.48	.21	.84
4	65.3	2.9	63.0	5.2	.578	.39	.19	.84
5	64.9	2.8	62.7	5.0	.572	.33	.13	.85
6	64.6	2.8	62.4	5.0	.567	.27	.12	.85
7	65.0	2.6	62.9	4.7	.576	.37	.07	.86
8	66.4	3.0	63.3	7.0	.584	.42	.66	.80
9	67.2	6.1	62.3	11.0	.565	.17	2.67	.70
10	68.0	7.7	62.6	13.1	.570	.20	3.31	.65
11	68.3	9.2	61.9	15.6	.557	.03	4.01	.60
Noon.	68.3	10.6	60.9	18.0	.539	5.82	.65	.56
1	68.4	11.6	60.3	19.7	.528	.69	5.12	.53
2	68.7	11.9	60.4	20.2	.530	.71	.30	.52
3	68.4	12.2	59.9	20.7	.521	.00	.41	.51
4	68.0	11.4	60.0	19.4	.523	.65	4.97	.53
5	68.5	9.5	61.8	16.2	.555	6.01	.18	.59
6	68.9	6.9	64.1	11.7	.599	.51	3.03	.68
7	68.7	5.6	61.8	9.5	.613	.69	2.43	.73
8	68.4	4.7	64.6	8.5	.609	.66	.13	.76
9	67.9	4.4	64.4	7.9	.605	.63	1.95	.77
10	67.4	4.0	64.2	7.2	.601	.60	.75	.79
11	67.0	3.7	64.0	6.7	.597	.56	.62	.80

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb.	Miles.	
1	...	...	W N W & W	14.0	434.1	O to 9, \searrow i to 11 A. M. \searrow i to 2. B to 11 P. M. Slightly foggy at 8 & 9 P. M. Dat Midnight & 1 A. M.
2	...	...	W by S & W	...	88.9	B to 4, \searrow i to 10 A. M., \searrow i to 3, \searrow i to 9, B to 11 P. M.
3	...	...	NE, W & W by S	...	76.6	B to 5, \searrow i to 7, \searrow i to 10 A. M. \searrow i to 4, \searrow i to 6, B to 9, \searrow i to 11 P. M. Slightly foggy from 8 to 11 P. M.
4	...	...	[& N N W W by S, W S W,	...	33.0	\searrow i to 1, B to 10 A. M., \searrow i to 2, \searrow i to 6, B to 11 P. M. Slightly foggy from 5 to 7 A. M.
5	...	...	N N W & N W	...	80.2	B to 10 A. M., \searrow i to 1, \searrow i to 6, B to 11 P. M.
6	...	...	N W & W N W	...	99.3	B.
7	...	...	W N W & N by W	...	90.3	B.
8	...	...	N N W & W by N	...	77.2	B to 4, \searrow i to 6, B to 11 P. M.
9	...	...	W by N & N N W	...	60.2	Slightly foggy from 8 to 11 P. M. B to 4, \searrow i to 8 A. M., B to 2, \searrow i to 6, B to 11 P. M. Slightly foggy from Midnight to 2 A. M. & at 10 & 11 P. M.
10	137.7	...	N N W & W N W	...	79.8	B to 6 A. M., \searrow i to 1, \searrow i to 8, \searrow i to 11 P. M.
11	135.0	...	W N W & N	...	63.7	\searrow i to 2, \searrow i to 5, \searrow i to 7, B to 11 A. M., \searrow i to 5, B to 11 P. M.
12	132.5	...	N	...	89.3	B to 6 A. M., \searrow i to 6, B to 11 P. M.
13	132.5	...	N & N by W	...	134.3	B to 3 A. M., \searrow i to 6, B to 11 P. M.
14	128.0	...	[& N N by W, N by E	...	179.0	\searrow i to 3, S to 8 A. M., \searrow i to 5, B to 11 P. M.
15	130.5	...	N & W	...	186.8	B.
16	137.8	...	W & W S W	...	87.4	B.
17	136.0	...	W S W & N	...	60.5	B. Slightly foggy at 6 & 7 A. M. & from 7 to 10 P. M.

\searrow i Cirri, — i Strati, \searrow i Cumuli, \searrow i Cirro-strati, \searrow i Cumulo-strati, \searrow i Nimbi,
 \searrow i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning,
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
18	134.0	...	N, N by E & W S W	...	54.1	B to 11 A. M., \i to 5, B to 11 P. M. Slightly foggy at 8 & 9 P. M.
19	135.0	...	S W & N by E	...	79.9	B.
20	134.0	...	E by N & N by W	1.6	91.0	B to 10 A. M., \i to 12, B to 11 P. M. Slightly foggy from 5 to 7 A. M.
21	130.0	...	N by W & N	...	206.7	B.
22	135.0	...	N by W & N N E	...	150.1	B to 4 A. M., \i to 2, \i to 7, O to 11 P. M. D at 11½ P. M.
23	...	0.17	N E & N N E	0.3	159.0	O to 4, S to 9, \i to 11 P. M. Light R from 8½ to 11 A. M. & at 3 & 4 P. M.
24	...	...	N & N N E	1.2	290.8	\i to 7 A. M., O to 7, S to 9, \i to 11 P. M. D at 7½, 9 A. M. & 3 P. M.
25	95.0	0.02	[& N by W N N E, W N W	...	191.4	B to 3, O to 9 A. M., \i to 12, O to 7, B to 11 P. M. Slightly foggy from 5 to 7 A. M. & at 10 & 11 P. M. Light R at 5, 6, 7 & 9 A. M.
26	126.4	...	[W N W N by W, N W &	...	100.8	B to 3, O to 10 A. M., \i to 5, B to 11 P. M. Slightly foggy at Midnight, 1 & from 6 to 8 A. M. & 7 to 9 P. M.
27	124.0	...	W & N N E	...	92.2	B to 5, \i to 8, B to 11 A. M., \i to 3, B to 9, \i to 11 P. M. Foggy from 7 to 10 P. M.
28	125.0	...	N by W & N N W	0.8	111.0	\i to 2 A. M., B to 11 P. M. Slightly foggy at 9 & 10 P. M.
29	130.0	...	N N W	...	153.3	B. Foggy from 8 to 10 P. M.
30	127.5	...	N N W & N	...	130.7	B. Foggy at 7 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,
\i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November 1876.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ...	29.938
Max. height of the Barometer occurred at 9 A. M. on the 21st ...	30.098
Min. height of the Barometer occurred at 1 A. M. on the 1st ...	29.514
Extreme range of the Barometer during the month ...	0.584
Mean of the daily Max. Pressures ...	30.010
Ditto ditto Min. ditto ...	29.873
Mean daily range of the Barometer during the month ...	0.137

	°
Mean Dry Bulb Thermometer for the month ...	73.3
Max. Temperature occurred at 1, 2 & 3 P. M. on the 2nd ...	84.0
Min. Temperature occurred at 7 A. M. on the 30th ...	59.8
Extreme range of the Temperature during the month ...	24.2
Mean of the daily Max. Temperature ...	80.8
Ditto ditto Min. ditto, ...	67.3
Mean daily range of the Temperature during the month ...	13.5

Mean Wet Bulb Thermometer for the month ...	67.2
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	6.1
Computed Mean Dew-point for the month ...	62.3
Mean Dry Bulb Thermometer above computed mean Dew-point	11.0

	Inches.
Mean Elastic force of Vapour for the month ...	0.565

	Grain.
Mean Weight of Vapour for the month ...	6.17
Additional Weight of Vapour required for complete saturation ...	2.67
Mean degree of humidity for the month, complete saturation being unity	0.70

	°
Mean Max. Solar radiation Thermometer for the month ...	129.8

	Inches.
Rained 5 days.—Max. fall of rain during 24 hours ...	0.17
Total amount of rain during the month ...	0.19
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ...	0.11
Prevailing direction of the Wind ...	N & N N N

* Height 70 feet 10 inches above ground.

*Abstract of the Results of the Hourly Meteorological Observations
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in the month of December 1876.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 39° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.012	30.094	29.940	0.154	66.4	74.9	58.7	16.2
2	29.992	.074	.928	.146	64.2	72.4	57.5	14.9
3	30.021	.106	.970	.136	64.1	74.0	55.5	18.5
4	.019	.104	.960	.144	65.0	75.5	56.5	19.0
5	.044	.097	.985	.112	66.4	76.5	57.5	19.0
6	.123	.191	30.057	.184	67.8	77.5	60.3	17.2
7	.148	.231	.086	.145	66.9	77.0	59.0	18.0
8	.066	.150	29.983	.167	67.2	76.5	59.5	17.0
9	.041	.118	.981	.137	67.0	76.0	58.8	17.2
10	.078	.167	30.025	.142	67.9	77.5	60.5	17.0
11	.063	.128	.002	.126	67.8	77.5	60.6	16.9
12	.058	.142	29.980	.162	68.0	77.2	60.0	17.2
13	.031	.105	.978	.127	68.1	77.9	60.5	17.4
14	.025	.101	.971	.130	67.2	77.0	58.8	18.2
15	.057	.166	30.000	.166	65.8	75.5	58.0	17.5
16	.035	.111	29.975	.136	65.3	75.0	57.5	17.5
17	.008	.067	.946	.121	66.0	75.5	57.7	17.8
18	.027	.099	.974	.125	66.6	75.5	58.5	17.0
19	29.996	.081	.935	.126	68.4	76.6	62.0	14.6
20	30.024	.100	.965	.135	67.4	75.0	60.8	14.2
21	.081	.151	30.033	.118	65.8	74.8	58.0	16.8
22	.084	.156	.014	.142	65.6	74.5	58.0	16.5
23	.099	.166	.052	.114	66.3	75.5	59.0	16.5
24	.104	.166	.049	.117	67.1	76.0	59.7	16.3
25	.103	.168	.040	.128	67.7	76.8	61.0	15.8
26	.097	.171	.032	.139	68.3	78.0	60.0	18.0
27	.102	.187	.041	.146	68.7	78.0	60.5	17.5
28	.081	.151	.024	.127	68.9	78.0	61.3	16.7
29	.084	.153	.031	.122	68.7	78.0	61.0	17.0
30	.118	.195	.067	.128	67.6	76.4	61.3	15.1
31	.097	.177	.025	.152	65.2	73.8	57.5	16.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1876.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	Gr.	Gr.	
1	59.5	6.9	51.0	12.4	.428	4.74	2.43	0.66
2	56.6	7.6	49.8	14.4	.371	.13	.56	.62
3	57.7	6.4	51.9	12.2	.398	.44	.23	.67
4	58.6	6.4	53.5	11.5	.421	.68	.19	.68
5	60.0	6.4	54.9	11.5	.441	.88	.29	.68
6	60.6	7.2	51.8	13.0	.410	.85	.63	.65
7	60.7	6.2	55.7	11.2	.453	5.02	.26	.69
8	61.4	5.8	56.8	10.4	.470	.20	.15	.71
9	61.4	5.6	56.9	10.1	.472	.21	.09	.71
10	61.5	6.4	56.4	11.5	.461	.11	.40	.68
11	61.8	6.0	57.0	10.8	.473	.22	.26	.70
12	61.2	6.8	55.8	12.2	.455	.03	.50	.67
13	61.0	7.1	55.3	12.8	.447	4.94	.61	.65
14	60.6	6.6	55.3	11.9	.417	.95	.40	.67
15	58.5	7.3	52.7	13.1	.409	.55	.49	.65
16	57.4	7.9	51.1	14.2	.388	.31	.62	.62
17	59.3	6.7	53.0	12.1	.426	.73	.35	.67
18	61.2	5.4	56.9	9.7	.472	5.21	.00	.72
19	62.7	5.7	58.1	10.3	.491	.42	.20	.71
20	61.0	6.4	55.9	11.5	.456	.04	.35	.68
21	59.5	6.3	54.5	11.3	.435	4.83	.21	.69
22	58.9	6.7	53.5	12.1	.421	.68	.32	.67
23	60.1	6.2	55.1	11.2	.444	.03	.22	.69
24	60.7	6.4	55.6	11.5	.452	5.00	.32	.68
25	61.6	6.1	56.7	11.0	.469	.17	.29	.69
26	62.2	6.1	57.3	11.0	.478	.27	.33	.69
27	62.6	6.1	57.7	11.0	.485	.34	.35	.69
28	63.1	5.8	58.5	10.4	.498	.49	.25	.71
29	63.0	5.7	58.4	10.3	.496	.47	.22	.71
30	60.5	7.1	54.8	12.8	.440	4.85	.59	.65
31	58.2	7.0	52.6	12.6	.408	.53	.38	.66

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	30.065	30.161	29.993	0.168	63.1	65.0	59.4	5.6
1	.055	.148	.981	.167	62.4	64.5	58.8	5.7
2	.046	.136	.971	.165	61.8	64.0	58.0	6.0
3	.086	.123	.963	.160	61.2	63.5	57.3	6.2
4	.033	.113	.973	.140	60.6	63.0	56.7	6.3
5	.048	.141	.982	.159	60.0	62.5	56.0	6.5
6	.066	.157	.991	.166	59.5	62.2	55.5	6.7
7	.086	.181	30.008	.173	59.3	62.0	55.5	6.5
8	.112	.208	.026	.182	61.9	64.7	59.8	4.9
9	.135	.230	.061	.169	66.2	69.0	63.4	5.6
10	.136	.231	.057	.174	69.6	72.5	66.5	6.0
11	.116	.211	.034	.177	72.4	74.8	68.7	6.1
Noon.	.085	.177	.018	.164	74.2	76.8	70.0	6.8
1	.046	.125	29.967	.158	75.2	77.0	71.0	6.0
2	.024	.108	.940	.168	76.0	77.8	72.0	5.8
3	.006	.090	.928	.162	75.9	78.0	72.4	5.6
4	.006	.093	.928	.165	74.6	76.7	71.5	5.2
5	.018	.108	.940	.163	73.0	75.5	69.7	5.8
6	.030	.119	.962	.157	69.8	72.4	66.0	6.4
7	.046	.139	.973	.166	68.1	70.2	64.5	5.7
8	.063	.158	.989	.169	66.8	69.5	63.5	6.0
9	.076	.170	30.008	.162	65.5	68.0	62.5	5.5
10	.080	.181	.018	.168	64.5	67.0	61.5	5.5
11	.076	.175	.005	.170	63.7	66.0	59.9	6.1

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1876.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°	°	°	°	Inches.	Gr.	Gr.	
Mid-night.	59.7	3.4	56.6	6.5	0.467	5.21	1.26	0.81
1	59.1	3.3	56.1	6.3	.459	.14	.19	.81
2	58.5	3.3	55.5	6.3	.450	.04	.17	.81
3	58.0	3.2	55.1	6.1	.444	4.98	.12	.82
4	57.5	3.1	54.7	5.9	.438	.91	.07	.82
5	57.0	3.0	54.3	5.7	.432	.85	.02	.83
6	56.6	2.9	54.0	5.5	.428	.80	0.98	.83
7	56.6	2.7	54.2	5.1	.431	.84	.90	.84
8	56.1	3.8	54.7	7.2	.438	.90	1.33	.79
9	60.0	6.2	55.0	11.2	.442	.91	2.21	.69
10	61.6	8.0	55.2	14.4	.445	.91	.99	.62
11	62.4	10.0	54.4	18.0	.434	.74	3.86	.55
Noon.	62.7	11.5	54.6	19.6	.437	.76	4.33	.52
1	62.7	12.5	53.9	21.3	.426	.65	.72	.50
2	62.9	13.1	53.7	22.3	.423	.61	.99	.48
3	62.9	13.0	53.8	22.1	.425	.62	.95	.48
4	62.3	12.3	53.7	20.9	.423	.62	.58	.50
5	62.7	10.3	54.5	18.5	.435	.75	.01	.54
6	62.8	7.0	57.2	12.6	.476	5.23	2.72	.66
7	62.4	5.7	57.3	10.3	.486	.37	.18	.71
8	61.8	5.0	57.8	9.0	.486	.38	1.88	.74
9	61.3	4.2	57.9	7.6	.488	.40	.58	.77
10	60.6	3.9	57.5	7.0	.481	.35	.41	.79
11	60.1	3.6	56.9	6.8	.472	.25	.34	.80

All the Hygrometrical elements are computed by the Greenwich Constants.

Meteorological Observations.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	^o	Inches		lb	Miles.	
1	127.0	...	N & N W	...	141.8	B. Slightly foggy from 8 to 10 P. M.
2	125.8	...	N W	...	110.1	B. Foggy from 8 to 11 P. M.
3	126.0	...	N W & W N W	...	80.4	B. Slightly foggy from Midnight to 4 A. M. & 7 to 11 P. M.
4	124.0	...	W N W	...	59.3	B. Slightly foggy from 7 to 10 P. M.
5	127.5	...	W by N, W & [W S W	...	65.3	B. Slightly foggy from 5 to 8 A. M. & at 7 & 8 P. M.
6	121.0	...	W S W & N N W	...	74.9	B. Slightly foggy at 7 & 8 A. M.
7	126.8	...	N N W, N N E	...	137.3	B.
8	125.0	...	N N W & W N W	...	131.0	B to 11 A. M., \i to 1, \i to 5, B to 11 P. M.
9	121.0	...	W N W & W by N	...	75.4	B to 11 A. M., \i to 3, \i to 5, B to 11 P. M. Slightly foggy from 5 to 7 A. M. & 8 to 11 P. M.
10	125.8	...	W by N & N N E	...	68.1	B. Slightly foggy from Midnight to 2 A. M. & 7 to 11 P. M.
11	126.0	...	N N E, N & N by E	...	99.8	B to 5 A. M., \i to 4, B to 11 P. M. Slightly foggy at Midnight & 1 A. M. & from 8 to 11 P. M.
12	127.2	...	N by E, N W & [N N W	...	108.4	B to 5 A. M., \i to 6, B to 11 P. M. Slightly foggy at Midnight & 1 A. M. & from 8 to 11 P. M.
13	129.5	...	W & N N W	...	82.8	B to 4, \i to 6, B to 9 A. M., \i to 5, B to 11 P. M. Slightly foggy at Midnight, 1, 5 & 6 A. M. & from 8 to 11 P. M.
14	128.0	...	N N W & N by E	0.4	68.0	B to 5, \i to 7, B to 11 P. M. Slightly foggy at Midnight & 1 A. M. & from 8 to 11 P. M.
15	127.0	...	N by E & N by W	...	114.5	B. Slightly foggy from Midnight to 2 A. M.
16	123.0	...	N N W	1.0	187.8	B.

\i Cirri, —i Strati, ^i Cumuli, \i Cirro-strati, ^i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1876.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Miles.	
17	122.5	...	N & N N E	...	181.1	B. Slightly foggy from 7 to 10 P. M.
18	118.5	...	N N E & S S W	...	67.6	B to 11 A. M., \i to 6, B to 11 P. M.
19	120.0	...	SSE, SE & NNW	...	59.3	B to 1 A. M., \i to 7, B to 11 P. M.
20	125.2	...	N by W	...	87.9	\i to 1, \i to 10 A. M. \i to 5, B to 11 P. M. Slightly foggy from 8 to 11 P. M.
21	124.9	...	N by W & N by E	...	87.8	B to 2 A. M., \i to 6, B to 11 P. M. Slightly foggy from Midnight to 2 A. M. & 7 to 9 P. M.
22	123.0	...	N by E	...	96.8	B to 12, \i to 5, B to 11 P. M.
23	124.0	...	N & N N E	...	147.8	B to 6 A. M., \i to 12, \i to 5, B to 11 P. M.
24	123.4	...	N N E & N by W	...	188.0	B to 11 A. M., \i to 4, B to 11 P. M.
25	124.0	...	N by W	...	124.9	Chiefly B.
26	126.7	...	N by W & N N E	...	108.9	B to 1, \i to 7, B to 11 P. M.
27	125.0	...	N by W & N	...	97.1	B to 12, \i to 3, B to 5, \i to 8, B to 11 P. M.
28	128.0	...	N & N N W	...	67.6	B to 5 A. M., \i to 2, B to 11 P. M.
29	127.0	...	N N W & N by W	...	64.4	B.
30	126.5	...	N by W & N W	...	104.5	B.
31	121.0	...	N & N N W	...	98.5	B.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1876.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	30.062
Max. height of the Barometer occurred at 10 A. M. on the 7th ...	30.231
Min. height of the Barometer occurred at 3 & 4 P. M. on the 2nd ...	29.928
Extreme range of the Barometer during the month	0.303
Mean of the daily Max. Pressures	30.137
Ditto ditto Min. ditto	30.002
Mean daily range of the Barometer during the month	0.135

	°
Mean Dry Bulb Thermometer for the month	66.9
Max. Temperature occurred at 3 P. M. on the 26th, 27th, 28th & 29th ...	78.0
Min. Temperature occurred at 6 & 7 A. M. on the 3rd	55.5
Extreme range of the Temperature during the month	22.5
Mean of the daily Max. Temperature	76.1
Ditto ditto Min. ditto,	59.2
Mean daily range of the Temperature during the month	16.9

Mean Wet Bulb Thermometer for the month	60.4
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	6.5
Computed Mean Dew-point for the month	55.2
Mean Dry Bulb Thermometer above computed mean Dew-point ...	11.7

	Inches.
Mean Elastic force of Vapour for the month	0.445

	Grains.
Mean Weight of Vapour for the month	4.98
Additional Weight of Vapour required for complete saturation ...	2.35
Mean degree of humidity for the month, complete saturation being unity	0.68

	°
Mean Max. Solar radiation Thermometer for the month	125.1

	Inches.
Rained no days,—Max. fall of rain during 24 hours	Nil
Total amount of rain during the month	Nil
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	Nil
Prevailing direction of the Wind	N N W, N by W & N

* Height 70 feet 10 inches above ground.

Abstract of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of Dec. 1876.

MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL.

EDITED BY
THE HONORARY SECRETARIES.



JANUARY TO DECEMBER,
1877.



CALCUTTA :
PRINTED BY C. B. LEWIS, BAPTIST MISSION PRESS,
1877.

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ERRATA

IN

PROCEEDINGS, ASIATIC SOCIETY OF BENGAL, FOR 1877.

- Page 5, line 4 from bottom, for *conquor* read *conquer*.
" 46, " 22 from top, for P. H. D. read P. W. D.
" 52, for footnote, read * about £ 480.
" 54, line 13 from bottom, for *commom* read *common*.
" 54, " 3 from bottom, for *denympho* read *de nymphe*.
" 66 is wrongly numbered 62.
" 69, line 7 from top, for *Crawford* read *Crawfurd*.
" 76, " 24 from top, for *execas* read *excess*.
" 76, " 3 from bottom, for *Shisticeps* read *schisticeps*.
" 80, " 8 from bottom, for *Waughton* read *Wangtu*.
" 131, " 2 from top, for 6th April read 6th June.
" 134, " 0 from top, for *nnder* read *under*.
" 139, " 23 from top, for *specifics* read *specifies*.
" 150, " 7 from top, for *June* read *May*.
" 195, " 2 from bottom, for *Monogamy* read *Polygamy*.
" 257, " 2 from bottom, for the volume read volume XLIII, part 1.
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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JANUARY, 1877.

The Monthly General Meeting of the Asiatic Society was held on Wednesday, the 17th January, 1877, at 9 o'clock P. M.

The Hon. Sir E. C. Bayley, K. C. S. I., President, in the chair.

The Minutes of the last Meeting were read and confirmed.

The following presentations were announced—

1. From the author, a copy of "Remarks on the Sikshâs," and "Kât-yâyana and Patanjali, their relation to each other and to Pâpini." By F. Kielhorn, Ph. D.

2. From the Superintendent Geological Survey of India, a copy of a work entitled "Eastern Persia, 1870-72"; Vol. I, "Geography with Narratives", by Sir F. J. Goldsmid; and Vol. II, "Zoology and Geology", by W. T. Blanford.

3. From the author, a copy of the "Arian Witness, or the Testimony of Arian Scriptures in corroboration of Biblical History and the Rudiments of Christian Doctrine." By the Rev. Dr. K. M. Banerjea.

4. From K. Kuroda, Chokuwan of Kaitakshai, Tokai, Japan, a copy of a work, entitled "Reports and Official Letters to the Kaitakushi", by Horace Capron, Commissioner and Adviser, and his Foreign Assistants.

5. From Bâbu Râm Dâs Sen, a copy of his "Aitihasika Rahasaya, Vol. II.

The following gentleman, duly proposed and seconded at the last Meeting, was balloted for and elected an ordinary Member.

Kumara Radha Kishor Deb, Juvraj of Hill Tiperah.

Dr. J. Muir, proposed by the Council at the last Meeting as an Honorary Member, was balloted for and duly elected.

The following are candidates for ballot at the next Meeting :

1. Mr. William Crooke, C. S., Goráhpur, N. W. P., proposed by Mr. V. A. Smith, seconded by Mr. H. Blochmann.

2. Capt. G. F. L. Marshall, R. E., proposed by Mr. J. Wood-Mason, seconded by Major H. H. Godwin-Austen.

THE PRESIDENT announced that the Council had contributed a sum of Rs. 500 in aid of a Zoological Exploration of Tenasserim, and that the same had started fully equipped under the charge of Mr. Limbörg. The results of the expedition would be published in the Society's Journal.

THE PRESIDENT exhibited the following silver coins and said—

"The ten coins, which form the remainder of the batch recently purchased from the Persian Gulf, belong to the group termed by Mr. Edward Thomas "Partho-Persian", which probably belonged to minor rulers in more or less subordination to the Parthian kings, the style of whose coins they follow in many respects.

"The coin which I have marked No. 1 appears to be identical with that marked as No. 8, of the plate given by Mr. Thomas in his paper on the Pehlevi Legends on Arsacidan Coins. Unfortunately the present coin is in bad preservation. No. 2 is a small coin of the same general type, *i. e.* with a head on either side, but the reverse head is boarded. The legend on the obverse is absent, but there is one on the reverse of which a few letters may be perhaps read as *ايزا* "Aeza". All the other coins have the "Mobed" and the fire altar on the reverse, and of these No. 3 seems to assimilate with the coin numbered by Mr. Thomas as 6 on his plate, the legend of which he admits to be doubtful. Nor can I venture to offer any decipherment of my own. The coin, though in good preservation, is very rudely executed.

"The coin I have marked as No. 4, approximates to that figured as No. 8 of Mr. Thomas's plate, but the legend in front of the fire altar seems to read not quite as in his coin *ارتخشتر* (1), (A)rethashtar, or Artaxerxes. I cannot pretend to offer any decipherment of the other coins; they are of rude execution, and the alphabet is one with which I am not familiar. I notice that two of the heads have, instead of the high Parthian cap, a triple pointed crown."

The following papers were read—

1.—*On Himálayan Glaciation.*—By J. F. CAMPBELL, Esq.
(Abstract.)

MR. CAMPBELL's observations refer to the outer Himálayan region between the Ganges and the Rávi, including the higher hills at Masúri and to Narkandá, north of Simlá. Within this area he could not find one 'perched block,' one hog-backed ridge, or one rounded valley. Everywhere far and

near he found the V-shaped form of denudation, attributable solely to rain and river action. In the superficial or the older conglomerates, however coarse, he could find no case of an erratic boulder-bed, nor anything like a moraine, and nothing to suggest the agency of floating ice in lake or sea. He considers that the great blocks so freely distributed in the Kánggrá valley are sufficiently accounted for as torrential deposits, by the very rapid fall of the streams from the Dhaoládhar range, aided probably by a once heavier rainfall and a corresponding increased snowfall on the summits. There is nothing, he thinks, to support the notion of an 'Ice-cap', or even of a 'glacial period', in the now current sense of that term.

The author gives some interesting antiquarian observations upon the traditions connected with the great boulders.

Mr. MEDLICOTT agreed with Mr. Campbell that no actual glacier had ever reached the Kánggrá valley, but thinks that ice had much more to say to the big stones than Mr. Campbell allows. The former great extension of Himálayan glaciers is established from indisputable observations in Sikkim and elsewhere. At that time ice must have been in force on the Dhaoládhar range, close over the Kánggrá valley. Further, the period of this Himálayan glaciation agrees, so far as can be determined, with the ice-age of the western continents.

Mr. H. F. BLANFORD said that he had expected that Mr. Campbell's paper would be much more subversive of accepted views, than proves to be the case. The notion of an ice-cap extending from the pole over the Himálaya to the neighbourhood of the equator, against which Mr. Campbell's argument is directed, was to him a new one, and, as far as he was aware, stood in no need of refutation. As regarded the view held by himself and not a few other Indian geologists, *viz.*, that in the latest geological times there had been a very great extension of the existing glaciers, and that glaciers were then formed at levels far below the present snow line, the validity of the existing evidence of Dr. Hooker's and Mr. W. T. Blanford's observations in Sikkim, and Major Godwin-Austen's in the Nágá Hills, did not seem to be in the least affected by Mr. Campbell's failure to discover ice markings on the great boulders on the flanks of the Dhaoládhar. It would be in the recollection of members of the Society that in papers published in the Society's Journal, Mr. W. T. Blanford had recorded the existence of moraines in Sikkim down to 6000 feet, and that Major Godwin-Austen has figured and described the beautiful examples of moraines, which he had discovered in the Nágá Hills at elevations of no more than 4500 feet. Having lately visited Nainítál, he thought he might adduce the site of this well-known station as another example of glacier action. The form of the valley, more especially the northern face, is strongly suggestive of ice denudation, the face of the slope

being planed off, as by the friction of a glacier; and presenting none of those subordinate ridges and spurs which are especially characteristic of drainage denudation. The lake is dammed below by a heap of blocks, some of gigantic size, which appear to be of the same hard limestone as forms the ridge at the head of the valley. Having been only two days in Nainítál, he had been unable to investigate the question satisfactorily, but his impression was that the lake was closed by a moraine. A leisurely examination of Nainítál and the other lakes in the vicinity would be an interesting and profitable employment for a geologist passing a season at one of the Kamáon hill-stations. Nainítál is at an elevation of only a little over 6000 feet, so that the supposed origin of the lake would fit in well with the facts recorded by previous observers. Glaciers do not now descend even in the Sikkim Himálaya below 14,000 feet, and to bring them down to 4500 would imply a reduction in the mean temperature of about 20° Fahrenheit.

He was quite unable to accept Mr. Campbell's suggestion that any considerable extension of the existing glaciers of the Himálaya could be accounted for by an increased supply of vapour, such as would be afforded, were, for instance, the Indus valley covered by the sea. The outer slopes of the Sikkim Himálaya now receive some of the heaviest rainfall in the world, the annual average recorded at Buxa Fort being 240 inches; yet the glaciers of Sikkim do not reach below 14,000 feet. His own belief was that the former extension of the glaciers could be explained only by a very great depression of the general temperature, possibly a reduction of the sun's heat, since the sun is known to be a variable star of short period, and may be so to a much greater extent, in long periods. But he did not think the evidence pointed to a greater reduction than he had suggested.

Major GODWIN-AUSTEN said—I quite concur in the remarks of Mr. Medlicott on the paper we have just heard read. In Kashmír undoubted traces of glaciers are to be seen, as low as 5000 feet in all the large valleys, in the grooved surfaces of the rocks on the sides of the valleys; and such glaciers once extended down to the gorges where the larger rivers enter the plain of Kashmír. Even at a lower elevation in the Jhílam valley, below Bárahmúlá, traces of such action are to be seen.

Very large masses of stone can be carried for long distances by the action of water alone, and I have seen many 10 to 12 feet in length, carried along on the bursting of a small glacial lake. When the Dhaoládhar range was covered with ice and snow, down to within 1000 or 2000 feet of the place where the large blocks alluded to by Mr. Campbell now lie, it is easy to conceive their mode of transport and deposition being due to the proximity of those old Dhaoládhar glaciers.

Dr. H. CAYLEY said—The power that floating ice possesses of carrying large blocks of stone long distances from the glaciers whence the ice was

derived is well shown in the Nubra Valley in Ladák. In this valley, both below its junction with the Shyok and also up the valley of the Shyok river, are to be seen here and there enormous blocks of granite, some as big as a cottage, lying at various distances from the bed of the river. These blocks are from the mountains near the Kumdán glaciers. A few years ago, these glaciers extended across and blocked up the upper valley of the Shyok river. After a time, the ice barrier gave way before the force of the water above, and enormous masses of ice were carried down by the flood through the Shyok and Nubra Valley, and deposited these blocks of stone in their course.

2.—*An Imperial Assemblage held at Delhi 8000 years ago.*—By RÁJENDRA-LÁLA MITRA, LL. D.

(Abstract.)

The ceremony of Imperial baptism was, in ancient times, called the *Rájasiya*, and the Aitareya Bráhmaṇa of the Rig Veda gives a list of ten persons who had celebrated it in remote periods of antiquity. The one best known to the people is, however, that which was celebrated by the Pándava brothers. It had a twofold character; first, the subjugation of a large number of princes and chiefs who had to acknowledge allegiance and vassalage; and secondly, a round of sacrifices and ceremonial observances spreading over a period of one year and a fortnight, from the full-moon day of March to the first new-moon of the year following. The observances of the first four months were in some respects similar to the Lent of the Christian Church. On the last day, after the offering of many oblations to the fire, the chanting of innumerable Sáma hymns, and repeated invocations of the Vedic gods Indra, Savitá, Rudra, Soma, and the Maruts, eighteen different kinds of fluids were consecrated and showered on the king through a golden rosehead. The king was then made to take three steps forwards towards each of the four quarters of the globe, and then, mounted on a chariot, driven towards a herd of cattle, the foremost animal of which he touched with the tip of his bow in token of his having accomplished a successful cattle-lifting raid. Sacrifices of a bull, a pregnant heifer and some goats next followed. The king offered an *arghya* to the most revered among his guests, and received the allegiance of his allies, tributaries, vassals, and friends; and the ceremony was brought to a conclusion by the priests offering to the newly-anointed sovereign a cup of Soma beer and a goblet of arrack, which he quaffed. The object of the ceremony is stated to be that the person inaugurated by it "should conquer in all the various ways of conquest; to subjugate all people; that he should attain to leadership, precedence, and supremacy over all kings, and attain everywhere and at all times to universal sovereignty, enjoyment of pleasures, independence,

distinction as a king, the fulfilment of the highest desires, the position of a king, of a great king, and supreme mastership; that he might cross with his arms the universe, and become the ruler of the whole earth during all his life, which may last for an infinitely long time; that he might be the sole king of the earth up to its shores bordering on the ocean.

Owing to the lateness of the hour, the President postponed the reading of the following papers to the next meeting—

1. *Rough Notes on some Ancient Sculpturings on rocks in Kamdon, similar to those found on monoliths and rocks in Europe.*—By H. RIVETT-CARNAC, C. S.

2. *On the Final Stage in the Development of the Organs of Flight in Orthoptera.* By J. WOOD-MASON.

3. *List of the Mollusca collected by Dr. J. Anderson in Yunnan and Upper Burmah, with descriptions of new species.* By G. NEVILL, C. M. Z. S.

4. *List of the Mollusca collected by the late Dr. Stoliczka when attached to the Embassy under Sir D. Forsyth in Yarkand and Ladak, with descriptions of the new species.* By G. NEVILL, C. M. Z. S.

The Meeting then adjourned.

At the request of the Government of Bengal, the Council have much pleasure in reprinting, for the information of the members of the Society, the following sketch by Mr. Cust of the progress of the researches in the Non-Aryan languages of India, which was originally written for the London Philological Society. They agree with Mr. Cust that vocabularies of the Non-Aryan languages are not wanting; but that it is desirable to proceed beyond that stage of inquiry and encourage the composition of practical grammars, and thus lead the way to the drawing up of comparative grammars for the several families of languages.

The Council have every reason to hope that this important *desideratum* will in course of time be supplied; and that some Members of the Society may have leisure to carry out the valuable suggestions made by Mr. Cust.

On the Non-Aryan Languages of India.—By R. N. CUST, Esq.

In the Annual Report [of the Philological Society] for 1875 a note is inserted on the Aryan and Southern Dravidian languages of British India and its Political Dependencies, using the latter phrase in its most extended sense without reference to the texts of treaties. The out-turn of grammars and dictionaries recorded in that note represents the work of the last quarter of a century. It is now proposed to indicate the languages spoken by residents of British India (exclusive of British Burmah) other than

Aryan and Southern Dravidian. Our researches will extend to tracts of country under native sovereigns more or less dependent, and to the wild tribes which inhabit the mountain fringe of the eastern border, or the imperfectly known uplands of Central India. In this direction emphatically lies the work of the next quarter of a century, for the harvest is ready, and the opportunity is offered, if workmen are forthcoming. For scant vocabularies and grammatical notes must be substituted in all cases good practical grammars, and in some cases scientific grammars, which will in due course be followed by scientific comparative grammars and dictionaries, embracing cognate groups, and thus making substantial contributions to the sum of linguistic knowledge in a most interesting direction—*viz.*, just at the point, where the monosyllabic structure is giving way to the earliest development of the agglutinating method.

Following the same geographical order as the one adopted in last year's note, we commence at the northern angle of India: at the spot where the three religions of Mahomet, Buddha, and Brahma, with their respective languages and written characters, converge. This spot is situated in the territory of the Maharaja of Cashmere, one of the great feudatories of the Empire. To the north of Cashmere proper is Little Tibet, or Bultistan, the capital of which is Iskardo, on the river Indus: in the population there is an admixture of Mahomedanism: the language is ostensibly Bhot or Tibetan, but there is occasional use of an Arabic written character; in fact it is debatable ground: but in the adjoining Middle Tibet, the capital of which is Ladakh, the population is Buddhist, and the language Tibetan, written in the character peculiar to that language, though derived from the Nagari. The population of both Little and Middle Tibet is civilized in the Asiatic sense, and resides on the highway of a future commerce betwixt British India and the great plateau of Central Asia, the scene of the future conflict betwixt China, the Mahomedan powers, and Russia.

Moving south-east, and crossing the Chenab river in the mountains, we enter the Province of Lahoul or Spiti, within the District of Kangra, and a component part of the Province of the Punjab. There, amidst lofty mountains, in hitherto inaccessible tracts, amidst a sparse and pastoral population of Buddhists, the school-master and missionary have located themselves, and in 1865 and 1866, at Kyelang, the capital of Lahoul, the Rev. H. A. Jaeschke, a Moravian missionary, lithographed a short practical grammar in English of the Tibetan language, with special reference to the spoken dialect and the wants of his mission, and a Tibetan and English Dictionary. He is now employed in Europe in the preparation of a superior work on the same language. This, perhaps, is the only portion of British India proper where the Tibetan language is spoken; but Tibet, with its capital Lhasa, is conterminous with the territories of our ally the Maharaja

of Nepal, and its prolific literature finds its way from native printing-presses of the Chinese type into that kingdom. Poor traffickers and monks annually visit Kathmandu, and sell books of inferior pretensions, as well as religious tracts. It is a language in the stage of transition from the monosyllabic to the agglutinating class, but akin to Chinese, of which empire Tibet is an integral portion: the people are Buddhists, and allow of no communication, even by letter, with British India, its Government or people: but from India many centuries ago they borrowed their religion, and the staple of their literature, which consists chiefly of religious works, translations from Sanskrit. The first grammar of this language was compiled by Csoma di Körös, after a long residence on the frontier, and published at Calcutta in 1834, followed by a dictionary: to this succeeded a grammar published in the German language, in Russia, by Schmidt, in 1841; and another in French by Foucaux at Paris in 1858: neither of the two last-mentioned scholars had visited India, and they are but followers of Csoma di Körös. Parts of the New Testament have been translated into Tibetan, but there is an absolute dearth in the whole of Europe of Tibetan scholars, and at a late meeting of the Geographical Society of London, a letter was exhibited from the Lama to a British officer, upwards of one hundred years old, which, whatever may have been the case then, is totally beyond the existing knowledge of the linguistic world in Europe. It is understood that there are several dialects of Tibetan, and, considering the vast extent and mountainous character of the great plateau, there is reason to expect scores of dialects. There are four variations of the alphabet—the first is in *capitals*: the second *small* letters: the third *cursive*: and the fourth an exotic, supposed to be identical with one of the Nepalese alphabets: all are derived from the Nagari.

Between Lahoul and the Nepalese frontier a considerable extent of mountainous country extends, occupied from time immemorial by a population professing Hinduism, but with some suspiciously non-Aryan customs, such as polyandry, speaking a dialect of Hindi, and under the rule of petty Rajas, in absolute dependence on the Government of British India. In one solitary tract north of the river Sutlej, and deep in the Himalaya, is found to exist a population speaking a non-Aryan language; this is Kunawur, a portion of the territory of the Raja of Bussahir, a small tract of mountains of an enormous elevation, occupied by a population of less than ten thousand, the majority of whom are Buddhists, and speak a language called Koonawuri or Milchan, akin to Tibetan, a vocabulary* of which was compiled by Captain Herbert. There are said to be a variety of dialects even in this narrow compass. The people, though simple in habits, are not uncivilized in the Asiatic sense, and in the chief Buddhist temple is an extensive library of Buddhist works.

Crossing the rivers Jumna and Ganges in the mountains, and traversing the Hindu hill tracts of Kumaon, we reach the upper portion of the river Gogra or Surju, and find ourselves within the boundaries of the kingdom of Nepaul, within which, in its long extension of many hundred miles to the frontiers of Sikkim, we find a score of non-Aryan languages, spoken by tribes, partly Hindu, partly Buddhist, and partly Pagan, dwelling in the valleys of the Himalaya, where the loftiest range on the face of the globe separates Buddhism from Hinduism, the Mongol from the Aryan, the Tibetan language and its congeners from the great Sanskrit vernaculars. This group may be called the 'Himalaic': to call them Bhutiya is incorrect linguistically, as that word in its general sense is synonymous with Tibetan, and in its special sense with the dialect of the kingdom of Bhutan: to call them sub-Himalaic is geographically incorrect, and some of the tribes inhabit the highest valleys: to call them Gangetic is to mislead, as they are spoken hundreds of miles from the Ganges, although the drainage of the southern watershed finds its way to that river. Here the most eastern wave of Aryan civilization rolls up against an impassable barrier, as the Kelts on the western wing of the Aryan army found in the Atlantic Ocean. Had not the mountains presented a physical obstacle, the elder culture, which Tibet had imported from China, would have given way to the fresher culture established at Kanouj and Benares: in spite of the mountain barrier, Tibet received from her Aryan neighbours her religion, her literature, and her written character, but she has conserved to this day her own language, and her own type of civilization, by enforcing with success a system of absolute isolation, which it must be the work of the next quarter of a century to break down.

All the languages of this group are more or less connected with Tibetan. Analogies with other groups are asserted: the great ethnological question lies before us, whether all these tribes crossed the Himalaya from Tibet at a period antecedent to the introduction of the Buddhist religion, or whether some migrated from Central India, or supplied colonies to Central India, from which they are now separated, and have been for centuries separated, by the great wave of Aryan immigration down the valley of the Ganges. It is maintained that their numerals, pronouns, and postpositions, are frequently identical. The Himalayan range is intersected by four great feeders of the Ganges, the Surju or Gogra, the Gandak, the Kosi, and the Tista: there is also a transverse section of lofty hills, of mountainous region of moderate height, and submontane tracts. In the lofty sites are found the Tibarahad and Hundesi languages. In the submontane tracts are found the Chepang, Vayu Hayu, Kusunda. In the western portion of the middle region we come across the Sumwar and Surpa; in the central portion is the important Newar, the Magar, Bramhu, Darahi,

Denwar, Pahri, Kaswar, Pukhya, Thakaya. In the eastern portion are the Limbu, Kiranti, Murni, and Gurung. In the adjoining kingdom of Sikkim is the Lepcha language, and in the kingdom of Bhutan, or Bhutant (the end of Bhut), is the Bhutiya proper. We have it on the highest authority that none of these languages are intelligible to others than the speakers, and that, with the exception of the Newar and Lepcha, they are absolutely devoid of literature and of a written character. The Newar has a few translations, but no dictionary or grammar. Mr. Hodgson has supplied a comparative treatise of Newar and Tibetân.* The Newar has no less than three alphabets, but all derived from the Nagari.

The sanitarium of Darjiling is situated in Sikkim, and this has led to the Lepcha language being utilized by Protestant missionaries. Portions of the Bible have been translated into it, and other books of an elementary character: this language is closely allied to Tibetan, but according to Csoma di Kőrös it had a non-Tibetan alphabet. A dictionary of this language had long been in preparation by Colonel Mainwaring, a resident at Darjiling, and a manuscript grammar by the same hand is in existence. The Lepchas and their neighbours, the Bhutiyas, are both Buddhists; so far they resemble each other, but the latter burn their dead like Hindus, have no form of marriage at all, and practise polyandry; the former bury their dead, and are monogamists. This is a fair instance of the extraordinary diversities of customs, cutting to the root of family life, under the same religious externals. With regard to the Kiranti language, it is asserted, that the complex pronominalization of the verb points to a special connexion with the Mundari, or Kolarian, language of Central India: analogies of formation of the same language with the Dravidian are also indicated. The tribe is also Pagan in the midst of Buddhists.

With the above exceptions we know little or nothing of any of these twenty-two languages or dialects of the same language (for we cannot say which), beyond the vocabularies carefully collected by Mr. Bryan Hodgson, late Resident of Nepal, a man who has done by patient research, and the devotion of a life, more for the advance of linguistic knowledge than any of his contemporaries. All subsequent vocabularies seem to be but repetitions of his labours. One of the dialects of Bhutiya proper appears to be called Changlo: the people who speak it are in the middle region of altitude, of a dark colour, which is indicated by their name, which means 'black'. This language introduces the name of another meritorious labourer in this great and unexplored field. Mr. William Robinson, Inspector of Schools of Assam, in 1849 compiled a short but serviceable grammar, or rather

* There are Grammars and Vocabularies of Tibarahad in the *Journal of the Bengal Asiatic Society*; and a Grammar of the Magar, published by Mr. Beames, 1869.

wrote down some practical grammatical notices of this dialect,* which give a far better insight into its structure and characteristics than any vocabulary : this excellent service he rendered to several other languages spoken in the neighbourhood of the Asam valley, in a manner well calculated to bring out the salient features of each. The alphabet of the Changlo is the same as the Tibetan, to which language it bears a close resemblance. A reprint of Mr. B. H. Hodgson's scattered papers, revised and corrected by that veteran scholar, has long been ready for the press, and one volume has actually appeared : the second volume is anxiously expected, as it will contain a reprint of the author's papers on the Kooch, Bodo, and Dhimal, on the one hand, and of the Váyú and Báhing on the other, and we can state, on the authority of Mr. Hodgson, that there is distinct evidence of the existence of two classes of languages : one of them, represented by the Váyú and Báhing, may be called the pronominalized or complex type : the other, represented by the Newar, Lepcha, and others, is the non-pronominalized or simple type. By the term is meant the use of the pronouns in the form of affixes and suffixes, the most familiar instance of which is known to us in the Hebrew language. It is clear, therefore, that the present classification of these languages is only provisional.

The Himalaic group may be said to have no future before them, and they only await the time to be improved off the face of the earth : under ordinary circumstances it might have been expected that to one of the group at least—notably the Newar—might have fallen the chance of becoming the political language of the whole tract, and thus (like the South Saxon, and the patois of the Isle de France) developing itself into a national language. But such can never be, for the intrusive Khass, or Parbatia variety of the Aryan vernacular of India, under the name of Nepalese, is already established at Kathmandu, the capital of the Gurkha dynasty. The civilization and religion of the court and the nobles is Hindu, and as this gradually extends, all that is Tibetan and Trans-Himalaic will be trodden down by its powerful and vigorous rival, which receives its new ideas from India, and not from Tibet. The non-Aryan languages are already affected by their Aryan neighbour, and are charged more or less with loan-words, and in some cases even the numerals have given place, and such a change made, that the classification of the living language begins to be ambiguous. As an instance of transition these languages will remain objects of interest, but no more.

Proceeding onwards in a south-easterly direction we come upon new languages, which, for the sake of sub-dividing a large subject, rather than from any well-defined distinctive type of language, have been grouped under the head of Lohitic, a fanciful and inappropriate name from one of

* The vocabularies and grammatical notices alluded to are to be found in the *Journal of the Bengal Asiatic Society.*

the less familiar names of an affluent of the Bûrhamputer or Sampu, which, entering British India at the extreme eastern point of the valley of Asam, for some distance flows westward betwixt two ranges of hills: at a certain point the southern range ceases, and the great river flows round this point, and altering its course discharges itself into the Bay of Bengal: on each side of this river, as it flows through the valley, are tribes speaking distinct languages, with a population calculated at little less than one million. We shall perceive, when we look at them closer, that, except in a geographical sense, or for temporary convenience, this grouping cannot be maintained. It was the original opinion of Mr. Hodgson that all these languages were Tamulian, a general phrase, by which he intended non-Aryan, or aboriginal. Dr. Caldwell has convincingly shown that, if by Tamulian was meant Dravidian, of which group Tamil is the chief member, the analogies pointed out betwixt Dravidian and these languages are less numerous, and of less essential character, and less distinctive, than the analogies which exist between the Finnish and the Dravidian, of a vague and structural character common to all languages of a Scythian origin. Max Müller maintains, that no trace of Dravidian has as yet been discovered, north of the Ganges. In the Dravidian, which is at a much more advanced stage of the agglutinating class, there is an entire absence of intonation; while in the Lohitic languages, as in the Chinese, they are conspicuous: indeed, Mr. Robinson describes four different intonations prevalent in the language bordering the Asam valley; and he maintains, that all these languages were originally monosyllabic, though gradually passing into the earlier stage of agglutination.

The first in order, as we enter the valley, are the Bodo, called also Borro and Kachari, and Dhimal, of which Mr. B. Hodgson has published a grammar and vocabulary. The same author furnishes particulars and a vocabulary of the Kooch language: the inhabitants of Kooch Behar have abandoned their ancient agglutinating language, and adopted a bad Bengali: they have become partly Muhammadan and partly Hindu: a small section have clung to their ancient faith and language, which is known as Pani-Kooch, and an examination of this residuum of an almost extinct unwritten language has led Col. Dalton to found the opinion, that it belongs to the Dravidian family, and has no connexion with the Kooch. The Kachari language, above alluded to, is also known as Mech. Mr. Robinson has supplied a grammar of this language, and Major Lance, Deputy Commissioner in Asam, has another in preparation: there is no written character, and the number of people who speak this language amounts to 60,000.

Following the range of mountains eastward, we come upon a race of downright savages and Pagans, practising polygamy and polyandry, who receive a black-mail from the Government of British India to compensate

for the lost privilege of making raids on the peaceful settlers in the valley : the Aka, whose language is known to us by a vocabulary prepared by the Rev. Mr. Brown, and another in the Journal of the Bengal Asiatic Society ; the Abor, of whose language we have a vocabulary prepared by Captain Smith ; the Doffia, of which we have a grammar by Robinson : the Miri, of whose language we have a grammar prepared by Mr. Robinson ; this tribe appear to have supplied interpreters to communicate with the others : and it is asserted that the word 'Miri' means 'go between', and is identical with the word 'Meriah' of the Khonds, so famous in connexion with the human victims sacrificed by that tribe ; the Mishmi, of whose language we have a vocabulary by the Rev. Mr. Brown. These tribes extend back through unknown tracts to the frontier of Tibet, and are under a very imperfect control on the part of the Government of British India.

At this point—the head of the Asam valley—we cross the Burham-puter River, and find traces of new linguistic influence, for we are not far distant from the boundaries of China proper ; and the Khamti language, of which we have a grammar by Robinson, is a member of the great Thai or Shan family, of which the Siamese is the political head. This tribe is but the representative of much larger and unknown hordes in Bor Khamti within the Burmese kingdom : they are civilized Buddhists, and have friendly relations with the Anglo-Indian authorities. At one period the Shans conquered the whole valley of the Burhamputer : the settlers assumed the name of *Ahām*, from the Sanskrit *asama*, 'unequalled' : like the Normans in France, they gradually lost both their language (Shan) and their religion (Buddhist), and still constitute a large portion of the population of the valley, under the name of *Ahóm*, as Asamese-speaking Hindus : only a few priests have preserved the ancient religion. It is worthy of remark that the valley is called Asam, and the people call themselves *Ahāma* from *Asāma* also. There is another Shan language, the Aiton, of which we have a vocabulary in Sir G. Campbell's *Specimens of Languages*. The Khamti has a strong resemblance to the Siamese : it is, purely monosyllabic, and more strongly accented than the other languages on the Asam frontier : it is in some degree connected with the Chinese itself, as the intonations are so finely modulated, that sounds organically the same express a totally different idea : inflections are unknown : the alphabet is derived from the Burmese.

Adjoining the Khamti is the Singpho tribe, whose language occupies a transitional position betwixt Tibetan and Burmese : one-fourth of its vocables are allied to Burmese, and one-fourth to Manipuri. This tribe is also the representative of a much greater horde lying behind, known as the *Kakhyen*, who occupy the hilly tract betwixt Burmah and Yunnan in China. Mr. Robinson, assisted by Mr. Bronson, has compiled a grammar of the

language : it is said to have a Shan alphabet. The Singhpos are civilized, but Pagans. It must be remembered that the point at which the Burhamputer bursts the mountain rampart into India is linguistically, politically, and ethnologically, one of the highest importance. The last and weakest tidal stream of the great Aryan river of religion, language, and civilization, flowed languidly up the Asam valley. More than once in history it has been met by a Shan counter-current, and may be met again. The incursion of the border-tribes into settled valleys is often an unwilling effort to escape from a superior force propelling them from their own haunts. By this outlet no doubt in times past the population of India has received great additions, though the superiority in number and calibre of the invaders from the North have borne them down ; and the Aryan settler under Hindu, Muhammadan, and Christian rule, has held its own.

The distance on the map from the extreme point of the southern mountains of the valley of Asam to Rajmahal, the extreme point of the Vindhya range, is, as the crow flies, not so great as to forbid the idea that India has been occupied at remote periods by pre-Aryan immigrants from the gorge of the Burhamputer ; but we await a more scientific comparison of languages, and more complete ethnological research, before the theory can be firmly substantiated, that the so-called Nishāda black aborigines were actually immigrants from the East.

After crossing the Burhamputer, the mountains return on the south side of that river in a westerly direction, enclosing the valley within a horse-shoe. Next to the Singhpo come the atrocious savages and Pagans, the Naga, over part of whose territory the Anglo-Indian Government has thrown a loose control, the nature of which can be best illustrated by the fact that within the last year they have killed their English Superintendent. Behind these lies the Burmese empire, and beyond the boundary the country is absolutely unknown : there are numerous clans of these turbulent highlanders, with a variety of dialects : of one at least Mr. Robinson, aided by the Rev. Mr. Brown, has prepared a grammar. The vocabularies of several of the Naga tribes are in the Journal of the Bengal Asiatic Society. A vocabulary of ten dialects has been published in the Journal of the American Oriental Society.

Next in order along this range are the Khasia or Cossiyah, and Jyntea, remarkable for their republican form of government and their monosyllabic language, akin to the Thai family, of which there is an excellent grammar by the Rev. Mr. Pryse, and an Anglo-Khasia dictionary by the Rev. Mr. Roberts : also a grammar by Robinson, and another published at Berlin by W. Schott : there is also an essay by the late Baron H. C. von der Gabelentz, published at Leipzig, 1850 : the New Testament has been translated into this language. They were Pagans.

Proceeding westward we come to the Garo tribe: their language has been thoroughly studied, and translations made into it by the American missionaries for educational purposes. We have a grammar by Robinson and T. J. Keith, and a dictionary by Keith, as well as a vocabulary by Ram Nath: Keith considers that the language has Aryan affinities, while Robinson compares it to Tibetan, and a connexion of the Garo with the Kachari on the other side of the valley is asserted, and is probable. They are Pagans, and surrounded on three sides by Hindu-settled districts; yet until very lately nothing was known of them.

Between them and the Asam valley is the tribe of Mikir, with a population of twenty-five thousand; a grammar of their language has been prepared by Robinson. They are a peaceable and settled people, though Pagans.

Such are the tribes surrounding the valley of Asam, and the exact position which each tribe bears to the Government of British India is not easily defined. Some are entirely subjects, and are good subjects: some are entirely independent, and most uncomfortable neighbours, but they are included in our political system as against the outer world: some pay revenue, some receive black-mail, some are Pagan savages, some civilized religionists of one of the known types.

We now return to the Naga Hills, and follow the mountain range which separates Burmah from British India. Just outside the boundary, but under treaty, is the kingdom of Manipuri. We have vocabularies of the Manipuri language by Mr. Hodgson and the Rev. Mr. Brown, and an English, Bengali and Manipuri dictionary. There is also a Manipuri grammar in the Journal of the Bengal Asiatic Society. The New Testament has been translated into Manipuri. They are a civilized people, and Hindus.

Proceeding southward we find in unsurveyed and impenetrable wilds, extending three hundred miles, the Kukis, one clan of which is well known from the late campaign, as the Lushais, and the more southern clan as Howlong and Sylu. Of their languages we have vocabularies by Captain Lewin and Major M'Culloch. In 1874, Captain Lewin published a valuable treatise: he explains that the people call themselves 'Dzos', that they have twelve tribes and dialects, but that the Lushai is the clan-language of all: that they never had a written character: that the main features of the language are agglutinative, as the root remains unchanged, suffixes being added, and the governed word precedes in the sentence the governing word. They are far from savages, though Pagan; they are civilized in the Asiatic sense, and exercise certain arts.

On reaching the hill districts of Chittagong we arrive very near the Bay of Bengal. These mountains are occupied by three classes. 1. The

Khyongthi, who are Buddhists, fairly civilized immigrants from Arracan, speaking a dialect of the Aracan language: their written character is the same as Burmese, which is in fact a branch of the same stock: it has a strong affinity to the Tibetan group. 2. The Chukmas, of uncertain origin, who are Buddhists, merging into Hindus, at the same time that their Aracanese language is yielding to corrupt Bengali. In their language words can be traced which belong to neither. 3. The Tounghtha, of mixed origin, if not the aboriginal inhabitants of the district, and more savage than the above-named. Among these are the Tiperahs, or Mrongs, Kumi, Mroos, Khyengs, who are subject to British India: Bungees, and Pankhos, who are partially, and Lushai-Kukis above-mentioned, Shendus or Lakhoys, who are entirely independent. All are Pagans, and most are savages. There is a vocabulary of the Khyeng language by Major Fryer, and of New Kuki by Lieut. Stewart, both in the Journal of the Bengal Asiatic Society. There is a vocabulary of the Tiperah language, but no written character; the same remark applies to the others. Little is known of the Shendu, but there is a vocabulary by Captain Tickell.

Proceeding southward we should enter British Burmah, from which for the present we abstain, and crossing the Bay of Bengal to land in Cuttack, we complete the circuit of the province of Bengal by enumerating the non-Aryan languages of Central India.

They consist of two great linguistic families, and are spoken by a population of not less than four millions, occupying a length of country of about four hundred miles from the District of Cuttack to Rajmahal, the boundary of Bengal and Behar. The two families are the Dravidian and Kolarian, and they are somewhat intermixed in their habitat, though perfectly distinct in appearance, customs, and language. Both lie outside of the Hindu and Aryan fold. Both are Pagan, and, if not savage in the sense of the Himalaic savages, yet fall short of the moderate type of Asiatic civilization: the language of both is agglutinating, and devoid of literature or of written character.

In the note in the report of last year a detail is given of the great Dravidian languages of Southern India, which are described as of Scythic origin, and connected with a pre-Aryan immigration from the West. Four tribes who spoke Dravidian languages are there mentioned as unimportant, two of whom will be noticed here. The Kota, a small Dravidian tribe in the Neilgherries, was incorrectly printed as Kole in last year's report: the two now to be noticed are the Gond, and Kandh, Khond, or Kho: two more are indicated as outlying members of the same family, the Uraon, and the Malers of Rajmahal. Thus we have four tribes in Central India whose language is Dravidian.

The Rev. Mr. Hurder has published a vocabulary of Rajmahali, and

Col. Ouseley, one of Uraon. Dr. Caldwell, in his *Comparative Grammar of the Dravidian languages*, has entered scientifically into the features of that family, which are well recognized. The Rev. Oscar Flex published in 1874 a good practical grammar of the Uraon language, and a considerable number of educational works have been published. A vast number of Aryan words have found their way into these languages, but the structure of the noun and verb has remained intact: when it is asserted, that the syntax has been assimilated to that of Hindi, we must pause, lest the argument should be turned round on the score of the well-known non-Aryan aspect of the Hindi sentence-method. Two of the Gospels have been translated into Gond. The Rev. Mr. Driberg published, in 1849, a very complete grammar and vocabulary of the Mahadeo dialect of the Gond, and Dr. Mauger published an account of the dialect of the Seoni Gonds. The remarkable feature of the Gond is, that it has a system of verbal modifications and inflexions almost as elaborate as that of the Turkish, while the great Dravidian sister-languages of the south are very meagrely furnished. Dr. Caldwell imagines that this unexpected development is due to the influence of the highly-inflected Sonthali, its Kolarian neighbour, which will be noticed below. There exists a lucidly arranged grammar of the Khond, published in the Uriya character by Lingam Letchmajee, 1853: and Dr. Mauger and Sir W. Elliot have published observations on these languages in 1847, in the *Journal of the Bengal Asiatic Society*. The Uraon and Rajmahali Maler contain a large admixture of roots and forms belonging to the Kolarian language. Mr. Hodgson considers the Uraon as a connecting link between the Kolarian family and the Rajmahali; and the Rajmahali as a connecting link between the Kolarian and Dravidian.

In the Kolarian family are many tribes under varying names, but which may be reduced to three great branches. 1. The Kols or Hos. 2. The Mundaris, or Mundas, or Bhumij. 3. The Sonthals. It is the generally received opinion, that the origin of this family is from the north-east, either from the farther side of the great linguistic watershed of the Himalaya, or down the funnel of the valley of the Burhamputer. Col. Dalton thinks that he can trace their progress through Asam into the Shan districts of Siam: the immigration from the north-west of the mighty Aryan race has severed this Central Indian family from its congeners. There is an asserted linguistic resemblance between the Mundari and the Mon of Pegu in British Burmah—this is stoutly denied by others. Nothing is impossible, but

πολλὰ μετέξῃ

Οὐδὲν τε σκιάοντα, θάλασσά τε ἡγήσασα.

A much more intimate knowledge of the structure of both languages is required to carry out such a connexion.

Capt. Haughton published vocabularies of some of the Kol dialects:

Capt. Tickell, in 1846, published a memorandum on the Holanguage. The Bible has been translated into Kol by the Rev. A. Nothrott. The Rev. J. Whitley, 1878, published a Mundari primer, and he asserts that any person familiar with this dialect will be understood by all Mundari-speaking people, and by the Lurka Kols. Hindi words have largely crept into use, and the struggle to retain this and the other non-Aryan idioms of a poor hilly tract may prove vain.

Two grammars have been published of the Sonthali language, one by the Rev. J. Philips in 1862, and a superior one by the Rev. L. Skrefsrud in 1878. Portions of the Bible have been translated into Sonthali. There are vocabularies of other dialects; but the learned missionaries, who have a Christian flock of thousands, assert that the same language is spoken by Sonthals, Munda-Bhumij, and others of the great Kol family, all the way from Orissa to the Rajmahal Hills. In grammatical structure, Sonthali is stated to be as superior to others as Sanskrit to its cognate languages. This bold assertion we are not in a position to test. But the second assertion, that the Sonthali is among the non-Aryan languages not even second to the Turkish in grammatical structure, is borne out by the artificial and complex, yet simple and transparent, symmetry of its verb-system; for it appears to possess voice, mood, tense, gender, number, person, case, forms, and conjugations, including five voices, five moods, and twenty-three tenses, three numbers, and four cases. And though the language is unwritten, the surprising fact is stated, that the Nagari alphabet of fifty letters represents the sounds, neither more nor less, with the single redundancy of *v*, and there exist common roots for very primitive ideas in Sanskrit and Sonthali.

It is not presumed that this sketch on a subject so obscure, extending over so vast an area, is exhaustive: no amount of precision can in the present state of our knowledge be obtained: the same tribes are called by different names, and different tribes included in the same nomenclature. It is asserted by some, that such well-known tribes as the Bhils have lost their language: by others that they still preserve it: what is preserved is attributed by some to the Kolarian, by others to the Dravidian family. In Kolhapur, under the Bombay Government, it is stated that certain dialects exist, and vocabularies are given: thus a question of degree is opened up: it may be that a language is wholly Aryan, but laden with non-Aryan vocables, the legacy of its extinct predecessor: when does a language end and a dialect begin? Another still more subtle point remains: it is admitted on all hands, that in the Sanskrit vernaculars there is a large residuum of non-Aryan words, and possibly we may have here tapped the common fount of the vocables of all the languages of India.

The work of the next quarter of a century is thus cut out, and consists in reducing to the form of practical grammars the leading and most

vivacious dialect of each group, marking the dialectal variations, and then drawing up a comparative grammar of each family. Pliny mentions that there were one hundred and thirty languages spoken in the Colchian market-place; the dialects of India outside the lordly Sanskritic vernaculars can be counted by scores. The savage Nagas are said to have thirty varieties of their own, as every stream or mountain ravine causes a corresponding dialectic fissure.

Vocabularies are not wanting, but we are getting beyond that stage of the inquiry. Dr. Hunter, in 1868, published one of a large number of non-Aryan languages: Col. Dalton has done the same in his *Ethnology of Bengal*: within the last year Dr. J. M. Conos has published a vocabulary of the dialects of Chota-Nagpore: Sir George Campbell, during the period of his being Lieut.-Governor of Bengal, collected and published specimens of the languages of India, with sentences of sufficient length to indicate structure of words and syntax: local vocabularies have been collected by other public servants, and notably by that illustrious linguist, Bryan Hodgson, the Resident of Nepal. In England, Latham in his *Elements of Comparative Philology* gives very brief sketches, and Max Müller, in his letter to Chevalier Bunsen, an appendix to *Philosophy of History*, treats the whole subject scientifically, and attempts classification; but his work is a quarter of a century behind date, and the author had no local knowledge. Numerous ethnical and political reports have been made on these tribes, which have been nearly a century in connexion with British India, but the chief feature of the annals of the border have been raids, and villages burnt in retaliation: our non-Aryan administration has been an unbroken failure. Within the last year Sir George Campbell collected and passed under personal review specimens of every tribe, and Col. Dalton has published photographs of nearly all.

Dr. Hunter, eight years ago, promised a comparative grammar, but the material collected is far from sufficient in quality and quantity for the construction of any sound principle of classification: many of the words entered in the vocabularies clearly are, and many more may prove to be, loan-words: the master mind is also still wanting, like the prince in the fable, to separate and group the confused heap of feathers.

And behind the linguistic question, which is the sole object of these remarks, lies the much greater one of race and religion; for the two hundred tribes, some of which we have noted, with perhaps six millions of population, are but the ethnical residuum *in situ* of the far larger portion, which has flowed down into the great crucible, and become fused into the lower strata of Hindu society all over India. There are two great fallacies which have to be dissipated—the first, that conquerors annihilate and destroy the races whom they invade and conquer: the second, that the Hindu religion is, and

ever has been, non-proselytizing. The whole history of India shows that the subject non-Aryan races were trodden down, utilized as helots, and admitted as an inferior caste into the Brahminical system: thus the subject races left their mark on the language of their conquerors; they lent words, and helped to modify syntax, but they lost their old language and identity, but preserved many of their customs and religious tenets under the veneer of a semi-Hinduism. Many tribes have retained their savage, or less civilized customs, and still lost their language, like the Bhils. Linguistically and ethnologically we have overlooked the vast residuum of non-Aryan races, and introduced little among them except a sale of fire-arms and spirits. It was a surprise that so large a proportion of the population of Lower Bengal were found in the last census to be Muhammadan: but these were non-Aryan immigrants from the eastern borders, who found Muhammadanism more to their mind, when they settled down to agriculture. Max Müller asserts broadly, that the majority of the speakers of Bengal are non-Aryan by race, and it will be our own fault, if the remainder do not find Christianity their best leader to civilization.

LIBRARY.

The following additions have been made to the Library since the Meeting held in December last.

TRANSACTIONS, PROCEEDINGS, AND JOURNALS, *presented by respective Societies or Editors.*

Berlin. Königlich Preussische Akademie der Wissenschaften,—*Monatsbericht.* Juli, August, 1876.

Juli. *Peters.*—Über *Stenoderma* Geoffroy und eine damit verwandte neue Flederthier-Gattung, *Pterorhinus*. *Studer.*—Über Echinodermen aus dem antarktischen Meere und zwei neue Seeigel von den Papua Inseln.

August. *Peters.*—Ueber die von dem verstorbenen Prof. Dr. Reinhold Buchholz in West-Afrika gesammelten Säugethiere. Ueber die von S. M. S. Gaselle mit gebrachten Amphibien. *Duncker.*—Ueber die Zeit der Abfassung des Avesta.

Bombay. The Indian Antiquary,—Vol. VI, Pts. 63 and 64. January and February, 1877.

Pt. 63. *Major J. W. Watson.*—Historical Sketch of the Hill Fortress of Pāwāgadh in Gujarāt, &c. *Dr. G. Bühler.*—Further Valabhi Grants.

Pt. 64. *Prof. Kern.*—The Inscriptions of Junnar. *M. J. Walkhouse.*—Archæological Notes, No. 14.

Calcutta. Geological Survey of India,—Memoirs, Vol. XII. Pts. 1 and 2.

- Mallet*.—Coal-fields of the Nágá Hills bordering the Lakhimpur and Sibságar Districts, Assám. *Foots*.—South Mahratta Country.
- Calcutta. *Memoirs*—Palaeontologia Indica, Ser. X. 2, and Ser. XI. 1, 1876.
 Ser. X. 2. *Lydekker*.—Molar teeth and other remains of Mammalia.
 Ser. XI. 1. *Dr. O. Feistmantel*.—Jurassic (Oolitic) Flora of Kuch.
 ———. *Do*. *do*. *Records*, Vol. 9. Pt. 4, 1876.
Dr. O. Feistmantel.—Notes on the age of some Fossil Floras in India. *R. Lydekker*.—Notes on the Osteology of *Merycopotamus Dissimilis*.
 ———. *Indian Meteorological Memoirs*, Vol. 1, Pt. 1, 1876.
 The Winds of Calcutta. The Meteorology and Climate of Yarkand and Kashghar.
- Leipzig. *Indische Studien*,—Vol. 14, Pt. 23.
- London. *The Athenæum*,—Nos. 2559 to 2567, 1876-77.
 ———. *The Geographical Magazine*,—Vol. III, Nos. 11 and 12, 1876, and Vol. IV, No. 1, 1877.
 No. 11. The Arctic Expedition. *Lieut. E. R. Crooks*.—On Foot through Central Japan. The German Expedition to Northern Siberia.
 No. 12. *Hissar and Kulab*.
 No. 1. The Abbé Desgodins on Tibet.
 ———. *The Institute of Civil Engineers*,—Proceedings, Vol. 45, Bt. 3, 1875-76.
 ———. *Nature*,—Vol. 15, Nos. 367 to 375, 1876-77.
 ———. *The Royal Society*,—Proceedings, Vol. 25, No. 172, 1876.
A. H. G. Doran.—On the Comparative Anatomy of the Auditory Ossicles of the Mammalia. *Prof. W. G. Adam*.—The Action of light on Selcizium. *C. Creighton*.—Note on certain unusual Coagulation-appearances found in Mucus and other Albuminoid fluids. *Ser. C. Shadwell*.—A contribution to terrestrial Magnetism.
 ———. *The Zoological Society of London*,—Proceedings, Pts. I and II, 1876.
 Pt. I. *T. H. Huxley*.—Contributions to Morphology. *Ichthyopsida*, No. 1. on *Ceratodus forsteri*, with observations on the classification of Fishes. *E. Z. Alston*.—On the classification of the order Glires. *Dr. T. S. Cobbold*.—Notes on Entozoa, Pt. III. Exhibition of, and remarks on, a parasite (*Echinorhynchus*).
 Pt. II. *Sir V. Brooks*.—On *Cereus Schomburgki*, Blyth. *A. G. Butler*.—Descriptions of *Lepidoptera* from the Collection of Lieut. H. Roberts. *H. Saunders*.—On the *Stercorariina* or Skua Gulls.
- Lyon. *La Société d'Agriculture, Histoire Naturelle et Arts utiles de Lyon*,—Annales, Tome 6 and 7, 4th Série, 1873-74.
- Manchester. *The Literary Philosophical Society of Manchester*,—*Memoirs*, Vol. 5, 3rd Series.
 ———. *do*. *Proceedings*, Vols. 13, 14, 15, 1873-76.
- Palermo. *Società degli Spettroscopisti Italiani*,—*Memorie*, Dispensa, 9, 10, 11, Ottobre, Settembre, Novembre, 1876.

- No. 11. *Prof. C. A. Young*.—Observations on the displacements of lines in the Solar spectrum caused by the Sun's rotation. *A. Serpieri*.—La luce sodiaca studiata nelle osservazioni di G. Jones.
- Paris. Société d'Anthropologie de Paris,—Bulletin, Tome 11, Fasc. 2, Mars à Mai, 1876.
- E. Hamy*.—Les Négritos de Bornéo.
- . Société de Géographie,—Bulletin, Octobre, Novembre, 1876.
- Octobre. *Dr. Harmand*.—Voyage au Cambodge. *F. A. Malte-Brun*.—Description géographique, historique et archéologique de la Palestine, par M. V. Guérin, chargé de mission. *L'Abbé Desgodins*.—Pays frontières du Thibet, de la Birmanie et du Yun-nan.
- . Société Zoologique de France,—Bulletin, Pts. 1, 2, 3, 1876.
- Roorkee. Professional Papers on Indian Engineering,—Vol. VI, No. 23, 1877.
- Yokohama. The Asiatic Society of Japan,—Transactions, Vol. 4, 1875-76.

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presented by the Authors.

- BANERJEE, REV. K. M., LL. D. The Arian Witness: or the Testimony of Arian Scriptures in corroboration of Biblical History and the rudiments of Christian Doctrine, 8vo., Calcutta, 1875.
- FOULKES, REV. THOMAS. The Legends of the Shrine of Harihara in the Province of Mysore. Translated from the Sanskrit. Demi 8vo., Madras, 1876.
- KIELHORN, F. DR. Katyáyana and Patanjali, their relation to each other and to Páṇini. Pamphlet, 8vo., Bombay, 1876.
- . Remarks on the Śikshás, with an account of the Śikshás collected. Pamphlet, demi 8vo., Bombay, 1876.
- PEARY CHARN MITTREA. The Psychology of the Aryas. Pamphlet, 1876, Calcutta.
- RAM DASS SEN. Aitihāsik Rahasaya, demi 8vo., Calcutta, 1876.

MISCELLANEOUS PRESENTATIONS.

- The Indian Antiquary, Vol. VI, Pts. 63 and 64, 1877.
- The Yajurveda Saṁhita, Pt. 24.
- FALLON, S. W. DR. A new Hindustani-English Dictionary, Pt. VI, 1876.
- HOME DEPT., GOVERNMENT OF INDIA.
- Records of the Geological Survey of India, Vol. 9, Pt. 4.
- DEPT. OF REVENUE, AGRICULTURE AND COMMERCE.
- BEVERLY, H. Administration Report of the Jails of the Lower Provinces for 1876.
- A classified alphabetical Catalogue of Sanskrit MSS. in the Central Provinces.

BOURDILLON, J. H. Report on the Administration of the Registrations Department in Bengal for 1875-76.

FULLARTON, BEATSON, J. Dr. Report of Vaccination in the Province of Bengal for 1876.

———. Annual Report on the Insane Asylum in Bengal for 1875.

GRANT, J. G. G. Dr. Annual Report on Inland Emigration to the districts of Assam, Cachar, and Sylhet, for 1876.

GOVERNMENT OF BENGAL.

Report on the Sanitary Administration of the Panjab for 1875.

Report on the Administration of the Panjab and its dependencies for 1875-76.

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MORRIS, J. H. Report on the Trade and Resources of the Central Provinces for 1875-76.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Catalogue of the books in the Library of the Manchester Library and Philosophical Society.

THE SOCIETY.

The Ramayanam, Pts. 5, 6.

THE EDITOR.

Eastern Persia, an account of the journeys of the Persian Boundary Commission, 1870-71-72.

THE SUPERINTENDENT GEOLOGICAL SURVEY OF INDIA.

PERIODICALS PURCHASED.

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Bombay. The Vedârthayâtna, or an attempt to interpret the Vedas, Pt. 7.

Calcutta. The Indian Medical Gazette, Vol. 11, No. 12, 1876, and Vol. 12, No. 1, 1877.

Leipzig. Annalen der Physik und Chemie, Nos. 9, 10, 11, 1876.

London. The Academy,—Nos. 236 to 243, 1876.

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———. The Journal of Botany,—Vol. V, No. 166, October, 1876.

H. F. Hance.—Two new Chinese Grasses. A new Chinese *Symplocos*. On two *Dipterocarpaceae*.

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W. T. Blanchard.—The African element in the Fauna of India: A criticism of Mr. Wallace's views as expressed in the "Geographical Distribution of Animals." J. C. Schrötte.—On the structure of the Mouth in Sucking Crustacea. J. Wood-Mason.—On the mode in which the young of the New-Zea-

land *Asteoides* attach themselves to the Mother. Description of a new species of Mantidae. *D. N. Sveretsoff*.—The Mammals of Turkestan.

London. Journal of the Society of Arts,—Vol. 24, Nos. 1243 to 1247, 1876.

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E. R. Lancaster.—On the Coincidence of the Blastopore and Anus in *Paludina vivipara*. *H. B. Brady*.—On some Foraminifera from the Loochoo Islands.

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Paris. Comptes Rendus,—Tome 83, Nos. 10, 11, 12, 13, 1876.

No. 10. *M. A. Housseau*.—Recherches sur la disparition de l'ammoniaque contenue dans les eaux. *MM. Mignon et Rouart*.—Résultats obtenus à l'aide de nouveaux appareils pour l'extraction des jus de la canne à sucre.

No. 11. *M. L. Lamattine*.—Procédé pour reconnaître les vins colorés artificiellement.

———. Journal des Savants,—Août, 1876.

MM. Barthelemy Saint-Hilaire.—Inspection archéologique d l'Inde.

———. Revue Critique,—Nos. 37, 38, 39, 1876.

No. 39. *L'Avesta*, tr. p. de Harlez.

———. Revue des deux Mondes, Tome 17, Livraison 2, 3, 1876.

———. Revue Scientifique,—No. 28, Janvier, 1877.

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BICKELL, GUSTAV. Kalilag und Damnag. Alte Syrische Uebersetzung des Indischen Fürstenspiegels, 4to. Leipzig, 1877.

GOEJE DE, M. J. Bibliotheca Geographorum Arabicorum. Pars tertia Descriptio Imperii Moslemici Auctore Al-Mokaddasi. 8vo. Lugduni Batavorum, 1876.

MILLS, CHARLES D. B. The Indian Saint, or Buddha and Buddhism. A Sketch, Historical and Critical, 8vo., Northampton, Mass., 1876.

STUMM, HUGO. Der Russische Feldzug nach Khiwa. Historische und Militair-Statistische Übersicht des Russischen Operationsfeldes in Mittelasien. Royal 8vo. Berlin, 1875.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR FEBRUARY, 1877.

The Annual Meeting of the Asiatic Society was held on Wednesday the 7th February, 1877, at 9 o'clock p. m.

COL. H. L. THUILLIER, C. S. I., Vice-President, in the Chair.

According to the Bye-Laws of the Society, the Chairman ordered the voting papers to be distributed for the election of Officers and Members of Council for 1877, and appointed Dr. Cayley and Mr. Waldie Scrutineers.

The CHAIRMAN then called upon the Secretary to read the Annual Report.

ANNUAL REPORT FOR 1876.

The Council of the Asiatic Society in submitting the Annual Report for 1876, have the satisfaction of exhibiting an unprecedentedly prosperous state of the Society's affairs. The year just passed has been one of the most eventful and important in the history of the Society, and it is to be hoped will mark a new era in its progress.

Under an agreement made with Government, the Council, on behalf of the Society, accepted the sum of Rs. 1,50,000 in lieu of the rooms originally assigned to the Society in the New Museum Building, and on completion of the negotiations, arrangements were made for the immediate removal of the Society's Collections to the New Museum. The Society's house is therefore now free from the Museum collections, and for the first time for many years the whole space is available for the more immediate purposes of the Society. This will enable the Council to assign proper space to the Library, and to make for the comfort of Members other arrangements that have hitherto been impossible. The house has been put in a state of thorough repair, and many improvements have been effected, and the Council feel assured that the arrangement under which the Society remains independent and in possession of their own building will be greatly to the

advantage of the Society, especially as they now possess one of the finest suites of rooms in Calcutta for their meetings, whilst the remaining space in the house is better adapted to the requirements of the Society, and the increasing stock of its publications, than the rooms in the New Museum ever could have been.

At the close of the year 1876, there were 347 Ordinary Members on the rolls of the Society, of whom 54 were in Europe. Of these Members in Europe 48 are non-subscribing Members, leaving a balance of 299 actual paying Members, of whom 119 are Resident, 175 non-Resident and 5 Life Members.

During the year under review, there has been an accession of 81 new Members, against 28 in the previous year, while the Society was deprived of 17 Ordinary Members by resignation, and 6 by death, making a loss of 23, and leaving a total number of Ordinary Members at the close of the year, 347 against 345 at the close of 1875.

The following is a tabular statement showing the fluctuations in the number of Members during the last ten years.

Year.	Paying.			Absent.	Total.
		Resident.	Non-Resident.	Non-paying.	
1867	307	154	153	109	416
1868	294	159	135	133	427
1869	304	162	142	138	442
1870	266	134	132	148	414
1871	286	112	174	160	446
1872	279	105	172+2 L.M.	159	438
1873	305	116	186+3 L.M.	53	358
1874	312	127	184+3 L.M.	32	346
1875	295	113	179+3 L.M.	50	345
1876	299	119	175+5 L.M.	48	347

Dr. Werner Siemens, Berlin, and Colonel Henry Yule, R. E., C. B. were in the past year elected Honorary Members.

Of the Ordinary Members the Council have to regret the decease of Mr. W. S. Atkinson, Dr. R. Brown, Captain J. Butler, Mr. W. L. Heeley, C. S., The Right Revd. Dr. R. Milman, Lord Bishop of Calcutta, and Mr. W. G. Willson. Captain Butler contributed several valuable papers to the Journal on the hill tribes of Eastern Asám and their languages; he died on the 7th January last from the effects of a spear-wound received while on political duty in the Nágá Hills. Mr. W. S. Atkinson was an accomplished entomologist, and had been for several years a Secretary of the Society, and a Society's Trustee of the Indian Museum. He died at Rome

on the 15th January. Mr. Heeley also had been for some time a Secretary of the Society and a Member of the Council and Philological Committee.

Of the Honorary Members—Prof. Jules Mohl, Memb. de l'Institut, Paris, and Prof. Christian Lassen, Bonn. A short account of the life and labours of Prof. Lassen, who had been an Honorary Member since 1881, was given in the June number of the Proceedings. Mr. Mohl, an oriental scholar of the highest reputation, was elected an Honorary Member in 1848, and was especially known for his critical edition of Firdausi's *Shāhnāmāh*, to which he devoted the last forty years of his life.

Of the corresponding members, Dr. M. Haug of Munich and M. F. H. Foucaux of Paris.

Indian Museum.

The Council continue to carry out the provisions of Act XXII of 1876, Act XVII. of 1866 having been repealed, and to transfer all Natural History and Archaeological specimens received by them to the Trustees of the Indian Museum. During 1876 the following specimens presented to the Society were transferred to the Museum.

1. Two pieces of Meteorite received from the Agra Archaeological Society.
2. A collection of Archaeological remains from Maldah.
3. A specimen of a Glass-sponge (*Hyalonema Sieboldii*).

The vacancies among the Trustees on the part of the Society, occasioned by the retirement of Dr. Oldham, Col. Hyde, Col. Gastrell, and Dr. S. B. Partridge, have been filled up by The Hon. Sir E. C. Bayley, K. C. S. I., Dr. T. R. Lewis, Captain J. Waterhouse, and Mr. H. Blochmann.

According to the provisions of the new Act, the number of Society's Trustees has been increased from four to five. A new Trustee will shortly be nominated.

Finance.

The sum received from Government in lieu of the accommodation in the New Museum has ensured the permanent financial prosperity of the Society, by giving it a certain and assured income in addition to the subscriptions of Members. Under the new rules a large portion of this sum, viz., Rs. 1,20,000 has been set aside as a Permanent Reserve Fund, which is to be increased yearly by the addition of the admission and compounding fees of Members. This Permanent Reserve Fund is not to be drawn upon except on very special occasions and with the full consent of the general body of Members. In course of time the income derived from this fund will enable the Society to take an active and prominent part in encouraging Oriental Studies, and stimulating the progress of research in

the Natural and Physical Sciences in this country : but before taking any definite steps in this direction, the Council consider it essential that this Permanent Reserve Fund shall be brought up to at least Rs. 1,50,000, so as to give the Society an income of not less than Rs. 6,000 per annum, independently of subscriptions. How far the Council will be able to do this at once will depend on the amount to be spent in repairs and fitting up the Society's Rooms.

As regards the present financial condition of the Society, the Council have the pleasure to report that the Assets of the Society at the close of 1876 consisted of :—

Government Securities,	Rs.	1,53,000	0	0
Balance in Bank of Bengal,	"	3,749	10	9
Cash in hand,	"	218	6	8

Rs. 1,53,968 1 0

of which Rs. 1,53,000 are actually invested in Government Securities, Rs. 5,000 of Government paper having been sold to meet the expenses of the repairs of the house. A farther sum of Rs. 19,000 has yet to be paid on account of repairs, furniture, &c., but the Council fully expect that when all expenses have been paid connected with the repairs and refitting of the Society's rooms, there will remain the sum of Rs. 1,38,000 to the credit of the Society.

The total subscriptions realized from Members amounted during the year under review to Rs. 9,009, which is less by Rs. 751 than the total subscriptions collected during the previous year. The outstandings of the Society up to the 31st December 1876, amount to the large sum of Rs. 6,270. The arrears due to the Society at the end of 1875 were Rs. 6,561, upon which amount the slight reduction of Rs. 291 has been effected. The Council would urge upon Members the importance of punctual payment of their subscriptions. The expenditure on account of repairs, &c., during 1877 will be heavy ; and the early paying up of all arrears would render it to a great extent unnecessary to touch the vested capital of the Society.

The following is a statement of the receipts and disbursements of the Society during the year :

RECEIPTS.

1875.

Subscriptions,	Rs.	9,760	15	0
Admission Fees,	"	980	0	0
Publications,	"	1,729	10	0
Library,	"	211	14	0
Secretary's Office,	"	24	15	6
Vested Funds,	"	449	8	0
Building,	"	4,800	0	0

1877.]

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Coin Fund,	Rs.	0	0	0
Sundries,	3,657	0	1
			Rs.	21,768	6	7

1876.

Subscriptions,	Rs.	9,009	1	9
Admission Fees,	...	...	...	800	0	0
Publications,	...	...	...	1,535	8	0
Library,	...	...	...	812	9	6
Fines and Commissions,	...	...	...	60	8	3
Received from Government,	...	...	...	1,50,000	0	0
Interest on Vested Funds,	..	...	...	13,675	14	8
Rent from Government,	...	...	...	1,920	0	0
Postage and Miscellaneous,	...	...	...	5,676	8	0

Rs. 1,82,989 18 2

Balance in the Bank of Bengal,	...	...	...	3,858	2	3
Cash in hand,	...	...	...	160	9	4

Total, Rs. 1,87,008 8 9

DISBURSEMENTS.

1875.

Publications,	...	...	Rs.	7,373	2	1
Library, ...	...	...	...	4,475	6	6
Secretary's Office,	...	...	...	3,769	9	9
Vested Funds,	...	...	...	4,078	9	8
Building, ...	...	...	...	1,008	12	7
Coin Fund,	...	...	...	876	4	0
Sundries, ...	...	...	...	3,686	8	3
			Rs.	24,768	0	3

1876.

Publications,	...	...	Rs.	8,893	14	6
Library, ...	...	...	...	3,161	7	7
Establishment and petty charges,	...	...	...	5,987	6	0
Government Securities purchased,	...	...	...	1,44,800	0	9
Premium and Commission,	...	...	...	6,162	0	10
Building Repairs,	...	...	...	9,247	7	6

Taxes,	Rs.	792	0	0
Coin Fund, ... ..	...	81	18	0
Postage and Miscellaneous, ... ..	...	8,964	6	4
		<hr/>		
	Rs.	1,88,040	7	9
Balance in the Bank of Bengal, ...	...	3,749	10	9
Cash in hand, ... ..	...	218	6	8
		<hr/>		
Total, Rs.		1,87,008	8	9

The following is the estimate for Income and Expenditure for 1877.

INCOME.

Subscriptions,	Rs.	7,500	0	0
Admission Fees, ... ..	...	800	0	0
Publications, ... ..	...	1,500	0	0
Library, ... ..	...	800	0	0
Interest on Vested Funds, ...	...	8,000	0	0
Postage, &c., refunded, ... ..	...	4,000	0	0
		<hr/>		
	Rs.	22,100	0	0

EXPENDITURE.

Publications,	Rs.	8,400	0	0
Establishment, ... ..	...	6,000	0	0
Building Repairs, ... ..	...	0,000	0	0
Coin Fund, ... ..	...	500	0	0
Library, ... ..	...	2,000	0	0
Postages, &c., ... ..	...	4,000	0	0
Taxes, ... ..	...	800	0	0
Balance, ... ..	...	400	0	0
		<hr/>		
	Rs.	22,100	0	0

The London Agency.

The last statement of accounts received from Messrs. Trübner and Co. the Society's London Agents, dates from the 1st July, 1875 to the 30th June, 1876. A balance of £15-14-6 was found to be due to Messrs. Trübner, which was remitted on the 8th December, 1876.

Within the above-mentioned period the sale of the Society's *Journal and Proceedings*, as shown in the accounts submitted, realized Rs. 679-8,

and the publications of the Bib. Indica, Rs. 860-15, making a total of Rs. 1,540-7, which sum amounting, at an exchange of 1s. 8d. to the rupee to £128-7-4½, was placed to the credit of the Society.

During the same time the Society forwarded to Messrs. Trübner by different invoices, for sale, 218 copies of both parts of the Journal and 108 copies of the Proceedings, valued at £49-1; and of the Bib. Indica publications 489 copies worth £32.

The Invoices received from Messrs. Trübner, comprising the publications of scientific Societies presented to, and subscribed for, by the Society, books to order, and books on inspection amounted to £149-12-7. From this sum £12-4-6 has to be deducted, as it represents the value of books sent out on inspection, which were declined by the Library Committee and returned to Messrs. Trübner. The next statement of accounts will be received from the Agents about August, and will show the business transacted up to the end of June of 1877.

Library.

During the year the additions to the Library comprised 1048 Vols. and parts of vols, of which 860 were obtained by purchase and 688 by presentation from the Government, from authors, and by exchange.

The Council regret that in consequence of the disorder caused by the removal of the Library for the repairs, it has not been possible to make any progress with the compilation of the new Catalogue. The Council however bear the subject closely in mind, and steps will be taken for immediately proceeding with this important work, as soon as circumstances will permit.

Arrangements will be made with the Society's London Agents and with local booksellers for the early supply of the latest standard works relating specially to India and the East, as well as for those of general scientific interest.

A furnished reading room has been provided for the use of members.

The Photographic Collection of the Society has only received two donations this year, consisting of a collection of photographs found among the effects of the late Dr. Stoliczka, and a set of photographs of the paintings at the Adjunta Caves in the Bombay Presidency, presented by the Government of India.

Five years ago the Council appointed a Pandit to prepare an ana-

*Names.	No. of MSS.	lytical catalogue of the Sanskrit
Grammar,	85	MSS. in the Society's Library, and
Dictionaries,	10	considerable progress has been made
Kośhas,	30	in the work. Upwards of eleven
Tantras,	108	hundred codices have been analyzed
Purāṇas,	115	and described in Sanskrit, as per
Medical Works,	40	memo on the margin.* A descrip-
Śāstrī,	185	
Jyotiṣha,	120	

Ohbandus,	6	tive account in English of all the
Alankasa,	16	MSS. on grammar has also been prin-
Sāṅkhyā,	10	ted under the superintendence of Dr.
Pātangala,	5	Rājendralāla Mitrá, and a fascicu-
Maimanāś,	36	lus of about 180 pages will be pub-
Nyāya,	64	lished in a short time. The other
Rāmāyana,	16	portions await translation into Eng-
Vedānta,	72	lish before they can be sent to press.
Kāvya,	125	
Miscellaneous of recent Collections,	80	
MSS. 1110		

During the past year the Pandit prepared notices of 178 MSS.

Dr. Rājendralāla Mitra has lately undertaken to prepare a catalogue *raisonné* of the collection of Buddhist MSS. from Nepal which Mr. B. H. Hodgson presented to the Society some years ago. The task is a difficult and extremely troublesome one, as it involves the necessity of reading a large mass of MSS., some of which are in the Gāthā dialect or corrupt Sanskrit, and written, for the most part, in the little-known Newāri character; but it is expected that with the aid of two Pandits who are now working under him, Dr. Mitra, will be able, in course of the current year, to bring to light the contents of this rare and valuable collection.

Maulawī 'Abdul-Haī Kātīb, under the superintendence of Mr. Blochmann, has begun to check the Arabic, Persian, and Urdú MSS., and prepare a new complete catalogue, which is urgently wanted.

Revised Rules.

During the year a revised edition of the Rules has been issued comprising several important additions, the principal of which are: the giving to the Council the power of electing Members during the Recess; the reduction of the Resident subscriptions from Rs. 12 to Rs. 9 per quarter, and the introduction of rules for the composition of subscriptions both by non-resident and resident Members. A rule for compounding subscriptions had long been required, but could not be introduced until the financial condition of the Society fully warranted it. The rules regarding the retention of Membership during absence from India and on leaving India permanently have also been remodelled, and the home subscription has been increased from Rs. 12 to Rs. 16 as it was found that the former rate was quite insufficient to meet the expenses incurred by the Society in supplying the Journal to absent Members with the cost of carriage to Europe. New rules have also been added regarding the disposal and custody of the Society's Funds. The Council have to acknowledge the assistance rendered in this matter by the Sub-Committee, comprising Messrs. W. T. Blanford, R. Taylor, J. O'Kinealy and the Secretaries.

Publications.

During 1876 the Society has issued 10 Numbers of the Proceedings, which together with the Meteorological Observations amount to 333 pages of letter press, illustrated by 8 plates.

Of the Journal, Pt. I, three Nos. have been issued containing 403 pages of letter-press with 7 plates. Of Journal Pt. II, 3 Nos. have been published consisting of 190 pages of letter-press illustrated by 14 plates.

The stock of the Society's publications, as also that of the Bibliotheca Indica, have been arranged on the ground-floor of the building.

Coin Cabinet.

The Coin Cabinet of the Society has, during 1876, acquired by presentations 4 gold, 8 silver, and 11 copper coins, and 6 silver coins by purchase. Of the gold coins the Society are indebted to Mr. Bourne for two, and to Dr. J. Scully for two. Of the silver and copper coins, Dr. Scully presented 8 silver and 9 copper, and Dr. Oldham 2 copper.

Repairs and Alterations.

As already reported to the Society, the Society's Rooms have been thoroughly repaired and several alterations and improvements effected.

The old Portico has been replaced by a new and more convenient one. The entrance into the house has been improved by the addition of a new door. A retiring room and a lavatory, have been fitted up on the ground floor. In lieu of the old wooden railing to the staircase, a new iron railing has been put up, and the staircase hall has been much improved by the enlargement of the skylight. The Meeting Room and other rooms round it have been coloured and ornamented, and the whole suite of public rooms, staircase, and approaches, have been lighted with gas.

In the Compound a new range of servants' houses has been built, and a handsome railing will be put up immediately along the Park Street front of the premises. That these alterations are a great improvement upon the old state of things there can be no doubt, and the Council have every reason to believe that they are regarded with satisfaction by the Members of the Society, who have seen them.

The amount spent up to 31st December, 1876 on account of repairs has been Rs. 9,200-0-0.

Pictures.

The collection of pictures in the possession of the Society has long been in a very bad state, and though a few of the worst were done up in 1874, the majority required a thorough cleaning. The whole collection has accordingly been placed in the hands of Mr. G. G. Palmer of the Surveyor General's Office to be cleaned and restored. Mr. Palmer has executed his task in a most satisfactory manner and has wonderfully improved the appearance of some of the pictures. The opportunity has also been taken of having all the frames repaired and re-gilt.

The expenditure on this account has been—

For the pictures, ...	...	Rs. 1,000 0 0
„ frames, ...	...	... 1,561 5 6
		<hr/>
		Rs. 2,561 5 6
		<hr/>

Registration of the Society.

As it was considered desirable that the Society should have a definite legal status, it has been duly registered under the Literary Society's Act (XXI of 1860), and a rule has been introduced giving the Council power to take proceedings under the Act for the recovery of debts due to the Society, though it is hoped that the necessity will never arise for any such extreme measures.

Secretary's Office.

Throughout the year 1876, the duties of Philological and Natural History Secretary, and the editing the respective Parts of the Journal have been discharged by Messrs. Blochmann and Wood-Mason. The General Secretaryship has been retained by Capt. Waterhouse. In June Col. Gastrell having resigned the Treasurership, consequent on his retirement from India, Mr. H. B. Medlicott, Superintendent, Geological Survey, took charge and, with the exception of the months of August, September, and October, during which time Capt. Waterhouse acted, has continued to perform the duties of that office.

The Council have reason to be satisfied with the zeal and energy shown by Mr. Leonard the Assistant Secretary during the year, and he promises, with more experience, to be a valuable servant of the Society. Babu Money Lal Bysack, who had served the Society for upwards of 24 years as Assistant Librarian, died in February last, and the Society have lost in him a faithful servant. Babu Judo Bindo Bysack, his son, has been engaged as Store-keeper and promises fairly. Babu Buddinath Bysack, the Cashier of the Society, having resigned in consequence of old age and increasing infirmities, his son Kedernath Bysack has been appointed in his place, and with occasional assistance from his father is carrying on the duties of his office.

Bibliotheca Indica.

Sanskrit Series.

The editors of the Sanskrit Series continue their labours with unabated zeal, and considerable progress has been made in bringing the larger works of the Series towards completion. Altogether nineteen fasciculi have been published, comprising portions of seven different works.

The *Saṁhitās* of the Sama Veda owe their distinctive character to a

large mass of accents, prosodial marks, and musical notes, and the necessity of supplying those marks and notes above and below the lines of the text, as usual in old MSS., has entailed enormous labour, and greatly swelled the bulk of the work. The third volume, completed during the year, has brought up the work to the third book of the second part, and two volumes more, or about fifteen fasciculi, will bring the work to a completion. The MSS. used all belong to the North Indian recension, with prosodial marks differing in some respects from what are current in Southern India, but the principal peculiarity being the use of figures instead of letters to indicate the notes of the gamut it is not of much importance.

The fourth volume of the *Chaturvarga Chintāmani* is devoted to optional fasts and penances, which disclose an interesting picture of the state of Hindu society at the time when it was compiled, and for some time previously. The work, besides, is replete with quotations from ancient authors, which are of great value in connexion with the history of the canonical literature of the country. Seven fasciculi of the work have been printed, and six more will complete the volume.

Dr. Rājendralāla Mitra has brought to conclusion his edition of the *Aitareya Aranyaka* of the Rig Veda with the commentary of Śāyana Achārya. The work was undertaken at the suggestion of Professor Max Müller, and it has been completed with the aid of six MSS., one of which was obtained from Dr. Burnell of Mangalore, another from Dr. Bühler of Guzerat, and four from Benares. The texts from Madras and Bombay, it appears, do not differ at all from the North Indian recension. The editor has supplied an abstract, in English, of the contents of the work, and a full account of the materials which he had at command in carrying the work through the press.

Of Vāchaspati Miśra's Gloss on Śaṅkara's Commentary on the *Vedānta Sūtras*, two fasciculi have been published during the year under report. It is expected the work will be completed in course of the current year.

Owing to the want of reliable materials the progress of the Society's edition of the Commentary on the *Nītisāra* of Kāmandaki had been for some time very much impeded. The want, however, has lately been supplied. During a recent tour in the North-Western Provinces in search of Sanskrit MSS., Dr. Rājendralāla Mitra procured a complete and very correct MS. of that work, and with its aid, the editor, Paṇḍit Jagamohana Tarkālakāra, will, it is expected, be able to complete the edition in course of the current year. Only one fasciculus of the work was printed during the past year.

Paṇḍit Chandrakānta Tarkālakāra continues his labours on the *Gṛīhya Sūtras* of Gobhila. The commentary on it has been compiled by the Paṇḍit with the aid of two defective MSS. and the glosses on the

Snána, the Sandhyá and the Parisishta Sûtras of which he possesses some excellent MSS. The work will prove of great value in explaining the domestic rites of the followers of the Sâma Veda.

The Society's edition of the Sañhitâ of the Black Yajur Veda, which was originally undertaken by the late Dr. Roer, and subsequently taken in hand by Dr. Cowell, is now being carried through the press by Professor Mahesachandra Nyâyaratna of the Calcutta Sanskrit College. The work is of large extent, and it will take three or four years yet before it can be completed. Only one fasciculus was printed during the past year.

Arabic and Persian Series.

In the Arabic and Persian Series, eight fasciculi were issued during the year.

Of the *Ipâbah*, or 'Biographical Dictionary of Persons that knew Muhammad', by Ibn Hajar, Maulawî 'Abdul Hai, Head-Professor of the Calcutta Madrasah, has issued Fasc. XIV and XV of Vol. II. A complete MS. of *Ipâbah* was kindly lent to the Society by Nawâb Sayyid Siddiq Hasan Khân of Bhopâl, and another MS. of the missing Vols. II and III was obtained from Maulawî Kabiruddîn. Maulawî 'Abdul-Hai, in October last, went on a pilgrimage to Mecca, where he expects to examine the MS. of the *Ipâbah* preserved there.

Major Raverty has issued two fasciculi, Nos. VII and VIII, of his annotated English Translation of the *Tabaqât-i-Nâçirî*.

Mr. Blochmann has issued two 4to. fasciculi, Nos. XVIII and XIX, of the Persian text of the *Âin-i-Akbarî*. Not quite two fasciculi more will complete the work.

Maulawî 'Abd-urrahîm of the Calcutta Madrasah has issued two 4to. fasciculi of Abul-Fazl's *Akbarnâmah*, Vol. II.

The following is a detailed list of the publications during 1876—

Sanskrit.

CHATURVARGA CHINTÂMANI, by Hemâdri, edited by Paṇḍit Bharata-chandra Siromani. Nos. 381, 341, 344, 354, Vol. II, Fasc. III to VI.

SÂMA VEDA SAÑHITÂ, with the commentary of Sâyana Âchârya, edited by Paṇḍit Satyavata Sâmasramî, No. 384, Vol. II, Fasc. VI. Nos. 339, 340, 342, 347, 348, 351, 355, Vol. III, Fasc. I to VII.

ÂITAREYA KRÂNYAKA of the RIG VEDA with the commentary of Sâyana Âchârya, edited by Râjendralâla Mitra. Nos. 385, 387, 345, Fasc. III to V..

BRÂMATI, a gloss on S'ânkara Âchârya's commentary on the BRAHMA SÛTRA, by Vâsachapati Miśra, edited by Paṇḍit Bâla Sâstrî. Nos. 386, 343, Vol. I Fasc. II and III.

NĪTISĀRA, or the Elements of Polity, by Kāmandaki with a commentary, edited by Jaganmohana Tarkālakāra. No. 388, Fasc. IV.

GOBHILĪYA GRĪHYA SŪTRA, with a commentary by the editor, edited by Chandrakānta Tarkālakāra. No. 346, Fasc. VI.

SAṆHITĀ OF THE BLACK YAJUR VEDA, edited by Dr. E. Roer, F. B. Cowell, M. A., and Mahēśachandra Nyāyaratna. No. 286, O. S. Fasc. XXIX.

Arabic and Persian.

TABAQĀT-I-NĀSIRĪ of Minhāj-i-Sirāj, translated into English by Major H. G. Raverty. Nos. 381 and 383, Vol. I, Fasc. VII and VIII.

AĪN-I-AKBARĪ, by Abul-Fazl-i-Mubārak-i-'Allāmī, edited by H. Blochmann, M. A., Nos. 349, 350, Vol. II, Fasc. XVIII, XIX.

THE AKBARNĀMAH, by Abul-Fazl-i-Mubārak-i-'Allāmī, edited by Maulawī 'Abd-urrahīm. Nos. 352, 353, Vol. II, Fasc. I.

IČĀBAH, or BIOGRAPHICAL DICTIONARY OF PERSONS WHO KNEW MUHAMMAD, by Ibn Hajar, edited by Maulawī 'Abd-ul-Hai. Old Series, Nos. 234, 235, Vol. II, Fasc. XIV, XV.

List of Societies and Institutions with which Exchanges of Publications have been made during 1876.

Agra :—Agra Asiatic Society.

Batavia :—Batavian Society of Arts and Sciences.

Belgium :—Geological Society of Belgium.

Birmingham :—Institution of Mechanical Engineers.

Bombay :—Branch Royal Asiatic Society.

„ :—Editor, Indian Antiquary.

Boston :—Natural History Society.

Bordeaux :—Bordeaux Academy.

Buenos Ayres :—Public Museum.

Brussels :—Royal Academy of Sciences.

Cherbourg :—National Society of Natural Science.

Calcutta :—Agricultural and Horticultural Society of India.

———— :—Geological Survey of India.

Christiania :—University.

Copenhagen :—Royal Society of Northern Antiquaries.

Cambridge :—University.

California :—California Academy of Arts and Sciences.

Dacca :—Editor, Bengal Times.

Dehra Dún :—Great Trigonometrical Survey.

Dublin :—Royal Irish Academy.

———— :—Natural History Society.

Edinburgh :—Royal Society.

- Frankfort** :—Natural History Society.
Geneva :—Physical and Natural History Society.
Genoa :—Museum of Natural History.
Königsberg :—Physical and Economical Institution.
Lahore :—Agricultural Society of the Pánjab.
Leipzig :—German Oriental Society.
Liège :—Royal Society of Sciences.
Leyden :—Royal Herbarium.
Liverpool :—Literary and Philosophical Society.
London :—Royal Society.
 ——— :—British Museum.
 ——— :—Royal Asiatic Society of Great Britain and Ireland.
 ——— :—Royal Institution.
 ——— :—London Institution of Civil Engineers.
 ——— :—Royal Geographical Society.
 ——— :—Museum of Practical Geology.
 ——— :—Zoological Society.
 ——— :—Statistical Society.
 ——— :—Geological Society.
 ——— :—Linnean Society.
 ——— :—Anthropological Institute.
 ——— :—Royal Astronomical Society.
 ——— :—Editor, *Athenæum*.
 ——— :—Editor, *Geographical Magazine*.
 ——— :—Editor, *Nature*.
Lyon :—Agricultural Society.
Moscow :—Society of Naturalists.
Madras :—Government Central Museum.
 ——— :—Literary Society.
Manchester :—Literary and Philosophical Society.
Munich :—Royal Academy.
Netherlands :—Royal Society.
New Haven :—Connecticut Academy of Arts and Sciences.
Oxford :—Bodleian Library.
Paris :—Imperial Library.
 ——— :—Anthropological Society.
 ——— :—Asiatic Society.
 ——— :—Geographical Society.
 ——— :—Ethnological Society.
Pisa :—Tuscan Society of Natural Sciences.
Stettin :—Entomological Society.
Stuttgart :—Natural History Society of Wurtemberg.

St. Petersburg :—Imperial Library.

———— :—Imperial Academy of Sciences.

Stockholm :—Royal Academy of Sciences.

Trieste :—Academy.

United States, America :—Geological Survey of the Territories.

Vienna :—Imperial Geological Institute.

———— :—Anthropological Society.

———— :—Zoological Society.

———— :—Imperial Academy of Sciences.

Washington :—Smithsonian Institution.

———— :—Commissioners of the Department of Agriculture.

ABSTRACT OF PROCEEDINGS OF THE COUNCIL DURING 1876.

January 25th. Special Meeting.

A letter was read from the Hon. E. C. Bayley, C. S. I., regarding certain proposals of Government for the grant to the Society of Rs. 1,50,000 in lieu of the rooms assigned to the Society in the New Museum Building under the Museum Act, and for the repeal of the Act in question, except in so far as it provides for the representation of the Society on the Board of Trustees, the separate notation of the Society's collections and the ultimate reversion of the Society's collections to the Society in the case of the determining of the Trust.

The Council agreed that Mr. Bayley be requested to communicate with the Viceroy and express the general willingness of the Council to accept the proposals of the Government, subject to further knowledge of the proposed changes when definitely settled.

January 27th. Ordinary Meeting.

The Secretary reported that the Sub-Committee appointed by the Finance Committee to ascertain approximately the cost of establishment and of premises, that would be required for carrying out the object of the O. P. Fund in an efficient manner, recommend that the present charges for establishment should be continued, as the Secretaries were of opinion that the work could not be efficiently carried on otherwise.

The recommendation was approved.

Colonel Gastrell suggested the discontinuance of the publication of the Meteorological Observations of the Surveyor General's Office in the Proceedings as Mr. Blanford would publish them in his Meteorological Reports.

The decision of the question was postponed pending the publication of the returns by Mr. Blanford.

February 7th. Special Meeting.

At this Meeting the draft of the New Museum Act was taken into consideration and was approved by the Council on behalf of the Society so

far as the interests of the Society were concerned. The Council also expressed their willingness to accept the sum proposed to be paid in lieu of the accommodation in the New Museum Building provided for the Society under the old Act.

February 24th. Ordinary Meeting.

In reply to a letter from Messrs. Trübner and Co. regarding the selling price of the Society's Journal and Proceedings in England it was ordered that the cost in England of the Journal and Proceedings should be at 3s. and 9d. respectively, with the addition of the average cost of postage to England, viz. :—8d. for the Journal, 4d. for the Proceedings.

On the report of the Natural History Secretary on the extra Number 4, Part II of the Journal containing the late Mr. Blyth's Catalogues of Burmese Fauna, the Council passed a special vote of thanks to Mr. Grote, Lord Walden, Dr. J. Anderson and Dr. G. E. Dobson, for their labours in connection with this work.

March 23rd. Special Meeting.

On this occasion the whole of the Members of the Council present in Calcutta attended to consider the Draft Deed of Release to be signed by the Council on the receipt of the sum of Rs. 1,50,000 from the Government of India in lieu of the accommodation in the New Museum.

The Draft Deed was approved with certain exceptions which were afterwards altered by the Government Solicitor.

March 30th. Ordinary Meeting.

On this occasion also the Meeting was attended by all the Members of Council present in Calcutta, and the Deed of Release was finally approved and duly executed by the Council on behalf of the Society.

The Secretary reported that Rs. 1,50,000 had been received from Government and suggested that the whole sum should be invested at once, such sums as might be required for repairs could be sold out afterwards.

It was ordered that the Manager of the Bank of Bengal should be asked to purchase Government securities for the whole sum to the best advantage.

A letter was read from the Government of Bengal forwarding a letter, No. 405, dated 16th March, 1876, from the Government of India, Home Department, requesting that the Catalogues of Sanskrit MSS. discovered in Bengal might be submitted annually instead of quarterly.

Read the Minutes of the Council on a letter from the Secretary to the Zoological Garden Committee, asking for pecuniary assistance from the Society and suggesting that the President of the Society should be a Member of the General Council of the Gardens, or that the Society should have the right to nominate such a member.

It was ordered that the question be referred to the Finance Committee with a recommendation that Rs. 1,000 should be given to the Gardens, should the funds admit, irrespective of all questions of privileges to be accorded to the Society.

A proposal of the Secretary to employ extra clerks for indexing the records of the Society was sanctioned.

The recommendation of the Finance Committee that the pay of the Duffry Baber Ali should be increased to Rs. 12 per mensem was agreed to.

April 27th. Ordinary Meeting.

An exchange of the Society's publications with those of the United States Geological Survey was sanctioned.

Also with the Civic Museum of Natural History of Genoa.

On an application from the Assistant Secretary for payment from the Conservation of Sanskrit MSS. Fund for work done on account of the Fund, it was ordered that the Government should be applied to for sanction to the payment of Rs. 150 yearly to the Assistant Secretary on the above account.

A Sub-Committee was appointed to take the necessary steps for obtaining a Memorial of Dr. T. Oldham, late President of the Society.

Mr. F. Beaufort, C. S., having expressed his wish to withdraw from the Society on leaving India after 37 years' Membership, the Council agreed as a special case, in consideration of the unusually long time Mr. Beaufort had been a Member of the Society, to continue to send him the publications of the Society free of charge.

The recommendation of the Finance Committee that the consideration of the question of giving a donation of Rs. 1,000 to the Zoological Garden be deferred till it is known what the repairs of the Society's premises will cost, was approved, and the Secretary requested to inform the Honorary Secretary of the Zoological Garden Committee that the Council are unable to give a donation at present as great expense will have to be incurred for the repairs of the Society's premises.

Messrs. B. Taylor and J. O'Kinealy were appointed Members of the Sub-Committee on the Compounding Fee question in place of Messrs. Geoghegan and Schwendler who had left Calcutta.

On the recommendation of Mr. Blochmann it was ordered that the publications of the Society should be supplied to M. Schefer who had been appointed to fill the Chair of Oriental Literature in the University of Paris held by the late M. Jules Mohl, an Honorary Member of the Society.

June 2nd. Ordinary Meeting.

The offer of Mr. W. Macgregor to present the Society with 100 copies of his pamphlet on the Prevention of Accidents from Lightning was accepted with thanks.

Several changes in the rules being suggested, the question of a revised set of rules was referred to a Sub-Committee composed of

Mr. W. T. Blanford.

Mr. H. Blochmann.

Mr. J. O'Kinealy.

Mr. J. Wood-Mason.

Mr. R. Taylor.

Capt. J. Waterhouse.

Mr. Blochmann's request to be allowed to send Arabic MS. No. 444 to Dr. Goeje of Leyden for use in the preparation of the new edition of Tabari was sanctioned on the condition that it should be returned within six months after date of receipt.

The exchange of the Society's publications with those of the Frankfort Natural History Society was sanctioned.

30th June. Ordinary Meeting.

Read a letter, No. , dated , from the Secretary to the Government of India, Home Department, requesting that the annual Catalogue of Sanskrit MSS., ordered in the Home Department Circular dated 10th March last, should in future be prepared for the calendar and not for the official year.

On the recommendation of the Finance Committee, the salary of Pandit Prem Chand Chaudari was increased from Rs. 30 to 40 per mensem, and that of Sib, sweeper from Rs. 5-8 to 7 per mensem.

Mr. Blochmann's request to publish an extra number of the Journal Part I. containing extracts from the Survey and other Government reports was sanctioned.

July 4th. Special Meeting.

The Council met to consider the Report of the Sub-Committee on the repairs required to the Society's House.

The report of the Committee was adopted with a few alterations, and it was agreed that the work should be entrusted to Messrs. Mackintosh Burn and Co. and put in hand at once.

The question of new godowns, shops and railing was deferred.

July 28th. Ordinary Meeting.

A letter from Mr. R. S. Brough suggesting the omission of the word 'Troy' after 'grains' in the Meteorological Reports, published with the Society's Proceedings, was referred to the Surveyor General.

Read a letter, No. , dated , from the Secretary to the Government of India, Home Department, sanctioning, in reply to the Society's letter No. 274, dated 5th May, 1876, the transfer from the purchase to the establishment grant for the conservation of Sanskrit MSS. Fund of Rs. 150 to be paid yearly to the Assistant Secretary of the Society.

Read the minutes of the Council on the new estimates and plans furnished by Messrs. Mackintosh, Burn and Co. for the repairs and alterations of the Society's premises.

It was agreed that the whole of the interior alterations and new portico be sanctioned and that the question of the new railing, entrance gate, durwan's lodge, godowns and shops be referred to the Society at large.

July 29th. Adjourned Meeting.

The Finance Committee's recommendation that Babu Buddinath Bysack, Cashier, should be permitted to resign and that his son Kedarnath Bysack should be appointed in his place, the new arrangement being tried for six months before being made permanent, was sanctioned.

The suggestion of the Secretary that an exchange of publications with the Imperial Geographical Society of St. Petersburg should be sought, was agreed to.

The Natural History Secretary reported the following resolution of a Meeting of the Natural History Committee held on the 27th July :

"That the Council of the Asiatic Society be asked to address the Government on the subject of Deep Sea Dredging Operations, to point out that as the Dredging Committee, referred to in the letter from the Government of India, No. 225 dated 26th March, 1872, has not been appointed, the Council would recall to the memory of the Government the previous correspondence, urge that the vessel now being built for the Marine Surveys may be properly equipped and fitted for Deep Sea Dredging, and that advantage be taken of the return into store of the 'Challenger' equipment to apply for a portion of the sounding lines and apparatus and dredging gear.

The Natural History Secretary was ordered to draw up a letter for submission to Government.

September 1st. Ordinary Meeting.

Read a letter from the Surveyor General stating that in future the word 'Troy' would be omitted after 'Grains' in the tables of Meteorological Observations issued from his office.

Estimates were presented from Mr. G. G. Palmer for cleaning and restoring the pictures belonging to the Society, and from Mr. Garrick and Babu Nobin Chunder Dutt for regilding and repairing the frames. Captain Waterhouse and Dr. Waller were asked to make the best arrangement possible for the doing up of the pictures and frames.

A proposal of the Secretary that Dr. Oldham should receive the publications of the Society gratis in consideration of his services to the Society, was agreed to.

November 3rd. Ordinary Meeting.

An offer of Professor E. Cowell of Cambridge to publish a translation of the Sūtras of Sāṅdilya in the Bibliotheca Indica Series was accepted with thanks.

Mr. B. H. Hodgson having called the attention of the Council to the neglected state of the MSS. collected by him in Nepal during 1824 and 1827, and suggested that a catalogue *raisonné* should be made of them, Dr. Rajendralala Mitra proposed the immediate employment of a pundit on Rs. 80 per mensem for the compilation of such a catalogue.

It was ordered that a grant of Rs. 300 should be made to Dr. Mitra for the cataloguing of these MSS., leaving all arrangements to him.

Read a letter from the Secretary to the Trustees of the Indian Museum forwarding a copy of an order of the Trustees to the effect that they agree to accept as correct the lists of the collections made over to them by the Asiatic Society as contained in the catalogues made in 1866 by Dr. Stoliczka and Mr. Ball.

It was ordered that the Trustees be informed that the Society agrees to accept the lists as proposed, and that they be asked to return the Society's copy of the lists duly signed by the Trustees.

November 30th. Ordinary Meeting.

Dr. Rajendralala Mitra's proposal that Professor Bāla Sāstri should receive the Notices of Sanskrit MSS. in place of the late Pandit Rajaram, was sanctioned.

The Secretary was authorised to purchase furniture for the reading room and to proceed with the immediate erection of the new range of godowns.

December 8th. Special Meeting.

This meeting was held to consider Major Godwin-Austen's proposal that the Society should give a grant-in-aid to a Zoological Exploration of Tenasserim by Mr. Ossian Limbörg—the results of the exploration being published in the Society's Journal.

The Council ordered that a sum of Rs. 500, including the unexpended balance of the Rs. 800 granted to the Earth Current Committee, should be placed at the disposal of the promoters of the Tenasserim Zoological Exploration.

On the motion of the CHAIRMAN the Report was unanimously adopted.

COLONEL THUILLIER said—He hoped he might congratulate the Society on the state of its affairs as represented in the report the meeting had just heard read. It was highly satisfactory to find that the finances were in

such a flourishing condition, and that the arrangements with the Government in regard to the Imperial Museum had been brought to the conclusion represented, by which the Society now enjoyed the comfort and advantage of the greatly improved and renovated building they were at present occupying with a certain fixed income accruing from the funded property.

For this state of things the Society was doubtless indebted to the careful and watchful management of the Council and its office-bearers, which had been very conspicuous during the year under review.

To the Joint Secretaries, he considered they were specially indebted for the able and indefatigable manner in which the business of the Society had been carried out, as well as for the regularity of the appearance of the Journal and Proceedings. In the Philological Department, the report just read spoke volumes of the valuable labours of Mr. Blochmann. The Natural History section had been well cared for by Mr. Wood-Mason, whilst in the general department the energy and good management of Captain Waterhouse, especially in all the arrangements connected with the repairs and alterations of the premises entitled him to their special thanks. The good services of Captain Waterhouse to the Society were very marked. He therefore proposed that the cordial thanks of the Meeting be passed to the Secretaries and Treasurer for their continued useful and valuable services to the Society, which he had great satisfaction in bringing to their notice.

The motion was carried unanimously.

The Scrutineers reported the election of Officers and Members of Council for 1877 as follows :

The Hon. Sir E. C. Bayley, K. C. S. I.

President.

Dr. Rájendralála Mitra, Rái Bahádur.

Col. H. L. Thuillier, R. A., C. S. I.

W. T. Blanford, Esq.

Capt. J. Waterhouse.

H. Blochmann, Esq., M. A.

J. Wood-Mason, Esq.

H. B. Medlicott, Esq.

The Hon. Sir E. C. Bayley, K. C. S. I.

Dr. Rájendralála Mitra, Rái Bahádur.

Col. H. L. Thuillier, R. A., C. S. I.

W. T. Blanford, Esq.

H. Blochmann, Esq., M. A.

Capt. J. Waterhouse.

J. Wood-Mason, Esq.

Dr. T. B. Lewis.

J. O'Kinealy, Esq., C. S.

} *Vice-Presidents.*

} *Secretaries and Treasurer.*

} *Members of Council.*

Bábu Prannáth Pandit, M. A.

Dr. W. K. Waller.

Dr. D. B. Smith.

H. B. Medlicott, Esq.

T. S. Isaac, Esq.

Dr. J. Anderson.

} *Members of Council.*

The following gentlemen were elected to audit the Annual Accounts for 1876.

R. Taylor, Esq., C. S.* and Major H. H. Godwin-Austen.

The meeting was then resolved into the Ordinary Monthly General Meeting.

Col. H. L. THUILLIER, C. S. I., Vice-President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The following presentations were announced—

1. From Dr. W. K. Waller, a copy of "Studies in Ancient History," comprising a reprint of "Primitivo Marriage," by J. F. McLennan, LL. D.

2. From the Author, a copy of 'La langue et la littérature Hindoustanic en 1876', by M. Garcin du Tassy.

The following gentlemen, duly proposed and seconded at the last Meeting, were balloted for and elected Ordinary Members—

Mr. William Crooke, C. S. ; Captain G. F. L. Marshall, P. H. D.

The following are candidates for ballot at the next Meeting—

Mr. Bazett Wetenhall Colvin, C. S., proposed by the Hon. Sir E. C. Bayley, K. C. S. I., seconded by Col. H. L. Thuillier, C. S. I.

Rev. A. G. Medlycott, proposed by Dr. E. W. Chambers, seconded by Mr. Alex. Wilson.

Mr. C. B. P. Gordon and Capt. T. Deane have intimated their desire to withdraw from the Society.

The CHAIRMAN announced to the Meeting that the New Museum Act had received the Viceroy's assent. The only point affecting the Society was the allotment of five, instead of four, Trustees to represent the interests of the Society.

* As Mr. Taylor was unable to undertake the task of auditing the accounts Mr. Waldie kindly did so in his place.

The following is the Act :—

ACT NO. XXII OF 1876.

PASSED BY THE GOVERNOR GENERAL OF INDIA IN COUNCIL.

*(Received the assent of the Governor General on the 17th of
December 1876.)*

An Act to provide for the management of the Public Museum at Calcutta.

WHEREAS, by Act No. XVII of 1866, reciting that it was expedient to provide for establishment of a Public Museum at Calcutta, to be called the Indian Museum, it was enacted that the Governor General in Council should cause to be erected at the expense of the Government of India a suitable building in Calcutta, to be devoted in part to collections illustrative of Indian Archaeology and of the several branches of Natural History, in part to the preservation and exhibition of other objects of interest, whether historical, physical or economical, in part to the records and offices of the Geological Survey of India, and in part to the fit accommodation of the Asiatic Society of Bengal and to the reception of their library, manuscripts, maps, coins, busts, pictures, engravings and other property ; and it was also enacted that the Government of India should keep the said building in repair and pay and defray the salaries, allowances and pensions of the officers and servants, and all other expenses connected with the said Museum ; and by the Act now in recital certain officials and other persons therein mentioned or referred to, to the number of thirteen, and their successors, were constituted a Body Corporate by the name of the Trustees of the Indian Museum, and the said Trustees were empowered to receive bequests, donations and subscriptions, and to deal with the same in the manner therein mentioned for the purposes of their trusts therein mentioned ; and it was also enacted that the said Trustees should have the exclusive possession, occupation and control, for the purposes of such trusts, of the said building, other than those portions thereof which, upon its completion, should be set apart by the said Trustees for the records and offices of the said Geological Survey and for the accommodation of the said Asiatic Society and the reception of their library, manuscripts, maps, coins, busts, pictures, engravings and other property ; and it was also enacted that all officers and servants, salaried or otherwise, employed in the care or management of the trust-property, should be appointed, and might be removed or suspended, by the said Trustees, subject to such regulations and conditions as the said Trustees should think proper ; and it was also enacted that the Council of the said Asiatic Society should cause the collections belonging to such Society, and illustrative of Indian Archaeology and the several branches of Natural History, and all additions that might be made thereto, to be removed to and deposited in the said building at the expense of the Government of India as soon as the same should be completed so far as to be

in a condition to receive the said collections, and that an inventory of the articles in such collections should be made by the said Society, one copy whereof was to be signed by the said Trustees and kept by the said Society, and another copy was to be signed by the said Society and kept by the said Trustees, and that the said Society should continue to have the same exclusive property in and control over their said library, manuscripts, maps, coins, busts, pictures and engravings which they then possessed, and that the Council of the said Society should have the exclusive possession, occupation and control, for the purposes of the said Society, of those portions of the said building which should be set apart for the accommodation of the said Society and the reception of their library and other property therein, before mentioned ;

And whereas the Government of India has caused the said building to be erected, and the Council of the said Society has caused the said collections belonging to the same Society to be removed to and deposited in the said building at the expense of the Government of India ; and an inventory of the articles in such collections has been made by the said Society, one copy whereof has been signed by the said Trustees and delivered to the said Society, and another copy has been signed by the Council of the said Society and delivered to the said Trustees ;

And whereas the said Trustees have, in pursuance of the said Act, set apart certain portions of the said building for the said records and offices of the Geological Survey of India ;

And whereas, in consideration of a sum of one hundred and fifty thousand rupees paid to them by the Government of India, the Council of the said Society has relinquished the exclusive possession, occupation and control secured to them by the said Act, of the portions of the said building which, under the said Act, were to be set apart for the accommodation of the said Society and the reception of their said Library and other property ;

And whereas it is expedient to alter the constitution of the said Body Corporate and to amend the law relating to the appointment and salaries of the said officers :

And whereas under the circumstances aforesaid it is expedient to repeal the said Act, and to re-enact it with the modifications hereinafter appearing ; It is hereby enacted as follows :—

Preliminary.

1. This Act may be called "The Indian Museum Act, 1876."
2. Act No. XVII of 1866 (*to provide for the establishment of a Public Museum at Calcutta*) shall be repealed. But all persons nominated under the said Act as Trustees of the Indian Museum, and all officers and servants appointed under the same Act and now holding office, shall be deemed to have been respectively nominated and appointed under this Act.

Incorporation of the Trustees.

3. The Trustees of the said Indian Museum shall be—
such Secretary to the Government of India as the Governor General in Council from time to time directs in this behalf,
the Accountant General,
five other persons to be nominated by the Governor General of India in Council,

the President of the Asiatic Society of Bengal and four other Members of the Council of the said Society for the time being, to be nominated by the Council of the said Society,

the Superintendent of the Geological Survey of India, and
three other persons to be elected by the Trustees for the time being and appointed under their common seal;

and such Trustees and their successors shall, subject to the provisions hereinafter contained, be and are hereby constituted a Body Corporate by the name of the "Trustees of the Indian Museum," and shall have a common seal, and by such name shall have perpetual succession; and all the powers of the said Corporation may be exercised so long and so often as there shall exist seven Members thereof.

4. The persons for the time being holding the offices respectively mentioned in section three shall be *ex officio* Members of the said Body Corporate, and shall cease to be such Members respectively upon ceasing to hold the said offices respectively :

Provided that, whenever the said Secretary to the Government of India, Accountant General or Superintendent of the Geological Survey of India is also the President of the said Society, the Council of the said Society may nominate any other person, being a Member of the said Society, to be a Trustee under this Act so long as such presidency is held by the said Secretary, Accountant General or Superintendent.

5. If any of the said Trustees for the time being dies or is absent from India for more than twelve consecutive months, or desires to be discharged, or refuses or becomes incapable to act, or not having been an *ex officio* Member of the said Body Corporate becomes such, or if any of the Trustees to be nominated by the Council of the said Society ceases to be a Member of such Council, then and in every such case the authority which appoints the Trustee so dying, being absent from India, desiring to be discharged, refusing or becoming incapable to act, or becoming an *ex officio* Member as aforesaid, or ceasing to be such Member of Council as aforesaid, may appoint a new Trustee in his place according to the provisions of section three,

and every Trustee so appointed shall thereupon become and be a Member of the said Body Corporate as fully and effectually as if he had been hereby constituted a Trustee.

Powers of the Trustees.

6. It shall be lawful for the said Trustees (a) to receive bequests, donations and subscriptions of land, buildings, money and any such objects of interest as aforesaid, and (b) to hold the same and to lay out such money for the maintenance, improvement and enlargement of the collections deposited in, presented to, or purchased for, the said Indian Museum, and otherwise for the purposes of the same Museum ;

and all such collections shall become the property of the said Trustees for the purposes of their trusts herein mentioned ;

and the said Trustees shall have the exclusive possession, occupation and control, for the purposes of such trusts, of the whole of the said building, other than those portions thereof which have been set apart by the said Trustees for the records and offices of the Geological Survey of India.

7. The said Trustees may from time to time make bye-laws consistent with this Act—

(a) for the management of the said Museum ;

(b) for the summoning, holding and adjournment of general and special meetings of the said Trustees ;

(c) for securing their attendance at such meetings ;

(d) for the provision and keeping of minute-books and account-books ;

(e) for the compiling of catalogues, and

(f) for all other purposes necessary for the execution of their trusts ;

8. Subject to such regulations and conditions as the Trustees think fit, they shall appoint, and may remove or suspend, all officers and servants, salaried or otherwise, employed in the care or management of the trust-property : provided—

(a) that no officer be appointed without the approval of the Governor General in Council if such officer be, at the date of his appointment, in India, or without the approval of the Secretary of State for India in Council if such officer be not then in India ;

(b) that no new office be created, and no salaries of officers be altered, without the previous sanction of the Governor General in Council.

9. The said Trustees may from time to time order any duplicates of printed books, medals, coins, specimens of Natural History or other curiosities deposited in the Indian Museum to be exchanged for manuscripts, books or other objects of interest, or direct any such duplicates to be sold and the money to arise from such sale to be laid out in the purchase of manuscripts, books, maps, medals, coins, specimens of Natural History or other curiosities that may be proper for the said Museum.

10. At all meetings of the said Trustees three shall be a quorum for the transaction of business and for the exercise of any of the powers conferred upon them by this Act.

Duties of the Trustees.

11. The said Trustees shall furnish to the Government of India, on or before the first day of December in each year, a report of their several proceedings for the past twelve months, and further shall furnish, on or before the same day in each year, to such Auditor as the Governor General in Council appoints in this behalf, accounts of all moneys expended by the Trustees during the past twelve months, supported by the necessary vouchers.

The said Trustees shall cause such report and accounts to be annually published for general information.

12. The said Trustees shall cause every article in the said collections belonging to the Asiatic Society, and all additions that may hereafter be made thereto otherwise than by purchase under section six, to be marked and numbered, and (subject to the provisions contained in sections nine and fifteen) to be kept and preserved in the said Indian Museum with such marks and numbers; and an inventory of such additions shall be made by the said Society, one copy whereof shall be signed by the said Trustees and delivered to the said Society, and another copy shall be signed by the Council of the said Society and delivered to the said Trustees, and shall be kept by them along with the inventory already delivered to the said Trustees as aforesaid.

13. All objects taken in exchange under section nine for, and all moneys payable on sale under the same section of, any of such articles, shall be held on trusts and subject to powers and declarations corresponding as nearly as may be with the trusts, powers and declarations by this Act limited and declared concerning the same articles.

Miscellaneous.

14. All officers and servants appointed under this Act shall be considered public servants within the meaning of the Indian Penal Code; and so far as regards their salaries, allowances and pensions and their leave of absence from duty, they shall be subject to the rules for the time being applicable to uncovenanted civil servants of the Government of India.

15. In the event of the trust hereby constituted being determined, all collections then in the said Indian Museum, other than those next hereinafter mentioned, shall become the property of the Government of India, and the collections and additions mentioned in section twelve shall become the property of the said Society or their assigns.

The CHAIRMAN laid before the Meeting the following Circular received from the Royal Academy of Sciences of Turin regarding the establishment of the Bressa Prize, which would be of interest to the Members of the Society.

THE BRESSA PRIZE.

The last Will and Testament of CESARE ALESSANDRO BRESSA, Doctor in Medicine and Surgery, signed the 4th September, 1835, contains the following clause :

"I leave all my property present and future, after paying certain legacies, to the Royal Academy of Sciences of Turin. The Academy may be represented by its Secretary, or by an attorney elected for that purpose by the resident members."

"On the decease of Signora Claudia Amata Dupéché, who has a life interest in all my possessions, the Royal Academy of Sciences of Turin will immediately enter in possession of everything, and may sell ground property, put capital out to interest, in any and whatever way it may find most profitable, and with the interest of this property a biennial prize is to be established, which will be adjudged in the following manner, *viz.* :—

"The net interest of the first two years to be given in premium to that person of whatever nation or country he be, who shall have, during the previous four years, made the most important discovery, or published the most valuable work on Natural and experimental Philosophy, Natural History, Mathematics, Chemistry, Physiology and Pathology, as well as Geology, History, Geography and Statistics.

"The net interest of the following two years to be given only to an Italian, who, by judgment of the above named Academy of Turin, shall have made the most important discovery, or have published the most important work, on any of the above mentioned sciences.

"The prize will continue to be distributed in the same order."

While fully aware of the great responsibility which rests on it, in being called to judge the productions of human intellect in a sphere so vast as to comprise nearly all the positive sciences, the Academy has accepted the task, with the intention of fulfilling to the utmost the generous wishes of the testator with regard to the promotion and advancement of Science.

The Bressa legacy remained free from all claims until the month of July 1876, consequently the first biennial term mentioned in the will, will include the years 1877—1878.

The first prize will be given in the year 1879 to that person, of whatever nation or country he be, who shall have, during the four previous years, made the most important and useful discovery, or published the most celebrated work, on any of the above-mentioned sciences.

The value of the first prize amounts to 12,000 Italian Lire.*

In accordance with the spirit of Dr. Bressa's will, the Academy will choose the best work or discovery, whether, or not, it be presented by the Author.

The prize in no case will be given to any of the National members of the Academy of Turin, resident and non-resident.

In the year 1881 the second Bressa Prize will be given for the prece-

* The Italian lira appears to vary in value from 7.8d. to 9.4d.—the above sum would therefore be between £370 and £490.—Ed.

ding quadriennial term 1877—1880, according to the above rules, except that in obedience to the testator's wishes it can only be conferred on an Italian.

And so on, every four years there will be a Bressa Prize for competition among scientific men of any part of the world, and every four years a Bressa Prize, which can be competed for by Italians only.

Turin, December 7th, 1876.

The President of the R. Academy

FEDERIGO SOLOPIS.

*The Secretary of the Class
of Physical and Mathematical
Sciences.*

ASCANTIO SOBBERO.

*The Secretary of the Class
of Moral, Historical and Philological
Sciences.*

GASPERE GORRESIO.

Mr. WOOD-MASON exhibited a specimen of a Newt, which he had detected in a small collection of insects and other objects recently made by Colonel G. B. Mainwaring in the Darjiling hills and said :—" The specimen is in the highest degree interesting not only as being the first example of Tailed Amphibian that has ever been found in India, but also as being an individual of the remarkable species described by Dr. J. Anderson (P. Z. S. 1871, p. 423) from specimens obtained by him around the little Chinese town of Nantin and in various other parts of the same region. *Tylototriton verrucosus*, as the animal has been called by Dr. Anderson, lives, in Western China, in flooded rice-fields, but in Sikkim, according to Colonel Mainwaring, in damp situations amongst decaying leaves and sticks. There is, however, nothing remarkable in this difference of habit, for the common eft of Europe is not unfrequently to be found on dry land at some distance from water under logs of wood, there being no necessity for the Urodelous Amphibia, after they have passed through that stage of their existence during which they are provided with external gills for aquatic respiration, to keep to the water. The entire order of Tailed Amphibia is confined to the temperate parts of the northern hemisphere, but two species have already been described from countries the fauna of which is largely leavened by Indo-Malayan forms, *Cynops chinensis* having been recorded from near Ningpo and *Plethodon persimilis* from Siam. This occurrence of a newt within the limits of the Oriental region is far from being without a parallel in other groups of animals also; *Nectogale* (vide W. T. Blanford, P. A. S. B., 1876, p.), *Anurosorex*, probably also *Oreosorex*, and a host of animals, vertebrate and invertebrate, extending still further southwards, being only to be looked upon as stragglers from the Palearctic region, or as outposts of it, to use the happy phrase of Dr. Günther. The only other form of newt at all resembling *T. verrucosus*, in which horny matter accumulated at the points where the ends of the ribs project against the external integument forms on each side of the middle line of the body along the upper side of the flanks a conspicuous row of great

rough horny tubercles, is *Pleurodeles*, in which these bosses are sometimes so highly developed as to have given rise to the incorrect notion that the ends of the ribs projected free through the skin.

The following papers were read :—

- 1.—*Rough Notes on some Ancient Sculpturings* on Rocks in Kamdón, similar to those found on Monoliths and Rocks in Europe.*—By H. RIVETT-CARNAC, C. S.

(Abstract.)

Mr. Rivett-Carnac describes the "cup-marks" observed by him on a rock about 2½ miles south of Dwará-Háth, and 12 miles north of Ránikhet in Kamdón, which resemble the cup-marks on the tumuli of Central India, noticed by him in the Proceedings for February, 1870, and those described by the late Sir James Simpson in his 'Archaic Sculpturings'. Near the rock is a Mahádeo Temple, known as the 'Chandeshwar Shrine'.

The cup-marks themselves are of two types, *first*, holes scooped out on the face of the rock, varying in size from 6 inches to 1½ in. in diameter ; *secondly*, 'ringed cups', each cup being surrounded by an incised ring. The latter marks, therefore, are but horizontal sections of the *lingam* placed on the *yoni*, and are thus ultimately connected with Mahádeo worship.

Though Sir J. Simpson summarily dismisses the theory of the cup-marks having reference to *lingam* worship, Mr. Rivett-Carnac adduces striking proofs of the correctness of this view, which is moreover confirmed by the sketches accompanying the paper.

Mr. Rivett-Carnac hopes to trace the rocks with their markings "from Madras through Central India and the Himálaya, and thus on through Central Asia to the Crimea and South Eastern Europe, and from thence to our own Islands. And if this is done, then there would seem to exist a sufficiently distinct tracing of the routes adopted by the tribe, one section of which went west, the other south, at a period of which there is but a faint historical record save on rough stones and temples with their markings of a type which are common to both Europe and India."

The paper concludes with interesting references to this subject from Madras and home papers.

It will be printed in No. I, Pt. I, for 1877.

- 2.—*On the Final Stage in the Development of the Organs of Flight in the Homomorphic Insecta.* By J. WOOD-MASON.

(Abstract.)

"La dernière mue développe subitement les organes du vol dans toute leur étendue par une transformation vraiment merveilleuse et encore inexpliquée, car on ne comprend pas comment des organes aussi volumineux peuvent être renfermés dans les petites gaines où ils se forment pendant la période denympha." DE SAUSSURE, *Mission Scientifique au Mexique et dans l'Amérique Centrale, Recherches Zoologiques, VI^e Partie, 1^{re} Sect., Études sur les Orthoptères, 1872, p. 224.*

"When an insect quits the egg it has no wings nor the slightest rudiments of such, these making their first appearance at one of the earlier changes of skin as slight prolongations of the posterior angles of the dorsal arcs of the two hindermost divisions of the thorax, the mesothorax and the metathorax. These prolongations are so many duplicatures or flattened evolutions of the integument, the chitinous membrane that covers them above and below and on the edges being in direct continuity with that which covers the insect's body,—being, in fact, part of it,—and the intermediate cellular layer which produces this chitinous membrane being similarly continuous with that which underlies the skin of the rest of the insect's body. They increase in size slightly at each successive moult, soon acquiring a definite triangular form and the principal nervure dividing the wing into its two principal areas; but relatively to the future wings they are small and insignificant even at the last moult, at which the organs of flight are suddenly developed to their fullest extent. If a wing-rudiment be examined just prior to a moult, it is found that its external chitinous covering has separated off so as to be easily detachable from a new wing-rudiment that has formed beneath it; and that the new wing-rudiment itself lies quite flat within its sheath, as the portion of the chitinous external layer which covers it may be called after its detachment. The new wing-rudiments are found to lie similarly flat within their sheaths at every change of skin down to and including the last but one, into the interval between which and the last it is that the growth of the wings from small and insignificant rudiments to their full extent is compressed. The penultimate change of skin accomplished, new wing-rudiments are produced in due course from the cellular layer, and, at the time when their sheaths first become detachable from them, they, like all their predecessors, lie extended quite flat within these sheaths; but the detachment of these is no sooner accomplished than they commence to grow with great rapidity. The first outward and visible signs of the growth that now ensues are the thickening of the prolongations (which up to this time were thin plates with thin and sharp edges closely embracing the insect's body, but which now gradually become biconvex masses with thick and blunt edges standing out from it) and the gradual obliteration of the principal nervure. The walls of the sheaths soon become distended to such a high degree of tenuity and consequent transparency under the enormous pressure put upon them from within by the rapidly growing wings, that it is possible to see, even without dissection, the manner in which these are forced to arrange themselves in so limited a space: it can be seen that the wings have thrown themselves into a multiplicity of closely-packed transverse folds representing increments of growth in length and that these again have disposed themselves, in groups, in wavy (longitudinal) folds representing growth in breadth; so that

the wings plaited and folded up in this complex manner present a superficial resemblance to the surface of a much convoluted brain or to a portion of a transverse section of a Labyrinthodont tooth. This mode of development of the wings obtains in all Orthopterous insects, upon larvæ of which these observations are mainly based; at least in some Neuroptera (*Termes*); and probably universally in the groups which Westwood long ago collectively termed the Homomorphie Insecta."

- 3.—*List of the Mollusca collected by Dr. J. Anderson, in Yunnan and Upper Burmah, with descriptions of the new species.* By G. NEVILL, C. M. Z. S.

This paper will be printed in the Journal, Pt. II, No. 1, for the current year.

- 4.—*List of the Mollusca collected by the late Dr. Stoliczka when attached to the Embassy under Sir D. Eversley in Yarkand and Ladak, with descriptions of the new species.* By G. NEVILL, C. M. Z. S.

This paper will be printed in Journal Part II, No. 1, for the current year.

- 5.—*On a case of Lightning; with an Evolution of the potential and quantity of the Discharge in Absolute Measure.*—By R. S. BROUGH.

The S. W. monsoon of 1871 may be considered to have been characterized in the neighbourhood of Calcutta no less by its copious and protracted rainfall than by the violence and frequency of its thunderstorms. During the progress of one of these storms in the early part of the monsoon, one of the trees standing near the gate of the compound of the building, then occupied by the Sadr Diwāni Adālat, and now used as the European Military Hospital, in Lower Circular Road, was struck by lightning. The branches of this tree overhung the wires of the Telegraph line, from which they were only about a foot distant. The discharge passed from the tree to the wires (of which there are four), broke fourteen double cup porcelain insulators, and passed to earth through the iron standards on which the wires are supported.

The one ends of all the four wires were connected to earth through instruments in the Calcutta Telegraph Office, at a distance of about $5\frac{1}{2}$ miles from the locality of the accident. The other ends were connected as follows to earth through instruments: the first at the Telegraph Workshops, a distance of less than $\frac{1}{2}$ mile; the second at the Lieutenant-Governor's residence, less than $\frac{1}{2}$ mile; the third at Atchipur, less than 14 miles; and the fourth at Diamond Harbour, less than 25 miles. At the moment of the discharge nothing extraordinary was noticed at any of these offices.

It is often far too generally stated in text-books that lightning invariably follows the best conductor to earth. This statement is misleading at the best; and is absolutely untrue if the word "conductor" be employed in the sense to which it is usually restricted in electrical science. In this instance, for example, we find that the lightning broke 14 insulators, each having probably an electrical resistance of several thousand megohms, in preference to traversing a wire resistance of not more than 500 ohms to earth through the receiving instrument in the Telegraph workshops. The writers appear to overlook the fact (experimentally illustrated long ago by Faraday) that there is exerted a mechanical stress proportional to the square of the potential tending to produce disruptive discharge, as well as an electromotive force proportional to the simple potential tending to produce a conductive discharge. Thus the discharge may occur either along a path of minimum mechanical resistance or along a path of minimum electrical resistance. Which form of discharge will occur in any particular instance depends of course on the special circumstances of the case; but, generally speaking, as the potential increases the tendency naturally is (*cæt. par.*) for the disruptive to predominate over the conductive. In the case of lightning the potential is so great, that for any form of "lightning-protector" to be efficient, the conductive facilities offered must be correspondingly great, that is, the protector must offer no sensible resistance to earth, otherwise a disruptive discharge may take place from the protector itself, which under these circumstances becomes merely a source of danger.* This tendency to disruptive discharge is taken advantage of to protect Telegraph instruments from lightning. An earth wire is brought very near to the line wire, from which it is insulated by only a very thin stratum of air: when the potential of the line wire rises abnormally, a disruptive discharge takes place at this point and the receiving instrument is thus saved.

I have twice lately seen it stated that Sir W. Thomson found that the resistance of air to disruptive discharge decreased as the thickness of the

* It is very necessary therefore that all systems of lightning-protectors should be tested for resistance from time to time. Mr. Schwendler's method of quantitatively testing "earths" has already been described before the Society. (Journal A. S. of Bengal, Part II, Vol. XI, 1871). In this method two temporary auxiliary earths are required. Calling the resistance of the lightning discharger earth x , and that of the auxiliary earths respectively y and z , the three resistances $x + y = a$, $x + z = b$ and $y + z = c$ are measured by any accurate method most convenient (*a. g.* Wheatstone's Bridge, Differential Galvanometer, Tangent or Sine Galvanometer, &c. or even an empirically calibrated galvanoscope) the mean of positive and negative readings being taken to eliminate any natural *x. m. f.* between the earths. From the results thus obtained the unknown resistance x can be calculated by the formula

$$x = \frac{a + b - c}{2}$$

stratum increased; and a French writer has referred the possibility of the occurrence of lightning discharges several kilometres in length to this cause. Sir W. Thomson's earlier experiments certainly showed this unexpected result, probably due to the minute distances at which he was operating, but a later series of experiments, made at larger distances, shewed this result in a much less marked degree; and Sir W. Thomson himself says, "It seems most probable that at still greater distances the electromotive force will be found to be sensibly constant, as it was certainly expected to be at all distances*."

Another assertion of the text-books is that the metallic rods now employed as lightning-protectors on buildings do not "attract" lightning. This statement is literally true, according to the meaning of the word "attract", but is untrue in effect. For such a rod-lightning-protector determines a line of maximum induction, and a discharge is more likely to occur at the place than if the protector were not there. Prof. Clerk Maxwell does not appear to hold this opinion; but it seems to me unquestionable that if a charged thunder-cloud, driving before the wind, is carried over a building furnished with a lofty metallic rod, discharge is more likely to occur than if the rod were away. In proof of this, I may refer to the case reported by Mr. Pidgeon in "*Nature*," and subsequently discussed before the Society of Telegraph Engineers (Proc. 12th May, 1875), in which the Flag-staff acted the part of an ordinary "lightning-protector."

Prof. Clerk Maxwell observed in his paper recently read before the British Association at Glasgow, that such lightning-protectors are designed rather to relieve the charged cloud than to protect the threatened building. In fact lightning-rods are legitimately employed for this very purpose in the vineyards, where the object in view is to relieve charged clouds and prevent disruptive discharges and the consequent showers of hail.

Under ordinary circumstances, however, the noise and light of the lightning flash must be regarded as a very harmless, if disagreeable, way of getting rid of some of the potential energy of electrical separation.

The protection of cities on the same principle, even if necessary or desirable would be too expensive and unsightly ever to be put in practice. But Faraday has proved that if our houses were made of metal, they would constantly remain at the potential of the earth, we should virtually be "under-ground," and live within them in perfect security. The iron churches occasionally employed in Europe fulfil this condition exactly. It is not of course usually practicable to live in metal houses, but we can live in almost equally effective metal cages formed by running conductors connected to earth along the summit, eaves, and corners of our houses†.

* Papers on Electrostatics and Magnetism, p. 269.

† This portion of this paper was written before the meeting of the British Association at Glasgow.

The usual rod-protectors appear to be only suitable to such structures as themselves determine lines of maximum induction, *e. g.* church spires, factory chimnies, flagstuffs, &c.

The case of lightning referred to at the beginning of this paper is of peculiar interest because we know precisely the mechanical effect produced by the flash, and from this we can work back and estimate roughly the potential and quantity of the electrical discharge.

In the first place we can calculate the force required to burst the cylindrical portion of the porcelain insulator into which the iron stalk is cemented.

Let r = radius of the inside of the cylinder

R = " " outside "

and F = the resistance to bursting

$$\text{Then,} \quad F = \int \frac{11^2 - r^2}{11^2 + r^2}$$

where $f = 66 \times 10^4$ grammes on the square centimetre.

Now the line wire was bound to the insulator by a thinner wire passing round it. The surface density could not have been uniform round the binding wire, but must have been greatest on the side touching the insulator.

By the method of electrical images in two dimensions it may be shewn that the surface density (σ) on the inner side of the binding wire is approximately

$$\sigma = \frac{Q}{4\pi^2 R \sqrt{d-a} (\sqrt{d+a} - \sqrt{d-a})}$$

where Q is the total charge on the binding wire, d the distance of the binding wire from the stalk of the insulator, and a the radius of the binding wire.

$$\text{But } 2\pi\sigma^2 = F$$

$$\therefore \sigma = \sqrt{\frac{F}{2\pi}}$$

Whence

$$Q = \sqrt{\frac{F}{2\pi}} \cdot 4\pi^2 R \sqrt{d-a} (\sqrt{d+a} - \sqrt{d-a})$$

which is the expression for the quantity of the charge on one insulator. As there were 14 insulators broken, this result must be multiplied by 14 in order to obtain the total quantity of the discharge.

Again the electrostatic capacity of the binding wire is

$$S = \frac{2\pi R \sigma}{d + \sqrt{d^2 - a^2}} \log e \frac{d + \sqrt{d^2 - a^2}}{d - \sqrt{d^2 - a^2}}$$

where $e = 1.9$ about.

But $VS = Q$

$$\therefore V = \frac{Q}{S} = \sqrt{\frac{F}{2\pi}} \cdot \frac{2\pi}{c} \sqrt{d-a} \left(\sqrt{d+a} - \sqrt{d-a} \right) \\ \times \log e \frac{d + \sqrt{d^2 - a^2}}{d - \sqrt{d^2 - a^2}}$$

which is the expression for the potential of the discharge.

Now in the particular case under consideration

$$r = 1.500 \text{ c. m.}$$

$$R = 8.000 \text{ c. m.}$$

$$d = 2.250 \text{ c. m.}$$

$$\text{and } a = 0.125 \text{ c. m.}$$

$$\text{Hence } F = 896 \times 10^8 \text{ grammes per sq. centimetre.}$$

$$\left. \begin{array}{l} 14 Q = 50586.5 \\ V = 722.7 \end{array} \right\} \text{ absolute electrostatic C. G. S. units.}$$

Changing the units to the ordinary ones in practical use, we find

$$14 Q = 16.86 \text{ microfarads.}$$

$$V = 216810 \text{ volts.}$$

Assuming the sparking distance to increase as the square of the potential, it can be calculated from the experimental results obtained by Messrs. Warren de la Rue and Muller (Proc. Roy. Soc. Jan. 1876,) namely, that 1000-rod chloride of silver cells give a spark 0.009166 inch, that a difference of potentials of 216810 volts would produce a spark in air between two electrodes at a distance of about 86 feet apart. This is of course a relatively very short distance, but it must be remembered that we have only taken into consideration that portion of the energy of the discharge which was employed in breaking the 14 insulators, and have neglected all that was spent in heat, light, &c.

The reading of the following papers was postponed—

1.—*Note on the Variation of the Barometric Tides in connection with diurnal Land and Sea Breezes.* By HENRY F. BLANFORD.

2.—*The Kaimûr Range.* By CHANDRASEKHARA BÂNURJĪ.

The Meeting then adjourned.



LIBRARY.

The following additions have been made to the Library since the Meeting held in January last.

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,
presented by respective Societies or Editors.

Birmingham. Institution of Mechanical Engineers,—Proceedings, Pts. I, and II, 1876.

Königsberg. Physikalische—O'ekonomische Gesellschaft,—Schriften, Jahrgang 16, Abth. I, II, 1875.

Leipzig. Deutsche Morgenländische Gesellschaft,—Abhandlungen, Band 6, No. 2.

F. Stenzler.—Indische Hausegelein. Pāraskara, Text.

London. The Athenæum,—Nos. 2554 and 2568, 1877.

———. The Institute of Civil Engineers,—Minutes of Proceedings, Vol. 46, Pt. 4, 1875-76.

———. The Anthropological Institute,—Vol. 6, No. 2, October, 1876.

Dr. Comrie.—Anthropological Notes on New Guinea. *A. Taylor.*—On the Origin of Numerals. *H. Clarke.*—On Prehistoric Names of Weapons. *Dr. Lubach.*—On the Hunebedden or Cromlechs in the Province of Drenthe, in Holland.

———. Nature,—Vol. 15, No. 367, 1877.

———. Royal Astronomical Society,—Monthly Notices, Vol. 36, No. 9.

———. The Royal Society,—Proceedings, Vol. 25, No. 178.

J. G. Jeffreys.—Preliminary Report of the Biological Results of a Cruise in H. M. S. "Valorous" to Davis Strait in 1875. *W. B. Carpenter.*—Report on the Physical Investigations carried on by P. Herbert Carpenter, in H. M. S. "Valorous," during her Return Voyage from Disco Island in August, 1875.

———. The Statistical Society,—Journal, Vol. 39, Pt. 8.

———. The Zoological Society,—Proceedings, Pts. I, II, and III, 1876.

Pt. I. *L. Taczanowski.*—Description d' un nouveau cerf tacheté du pays d' Ussuri méridional, *Cervus Dybowskii.*

Pt. II. *A. Anderson.*—Corrections of, and Additions to, "Raptorial Birds of N. W. India."

Pt. III. *Dr. Günther.*—Remarks on some Indian and more especially Bornean Mammals. *G. E. Dobson.*—On *Mytacinia tuberculata*. *W. T. Blanford.*—Note on "Africa-Indien" of A. von Pelzeln, and on the Mammalian Fauna of Thibet. On some of the Specific Identification in Dr. Günther's Second Report on Collections of Indian Reptiles obtained by the British Museum. *Lieut. E. W. Ramsey.*—On an undescribed species of Nuthatch and another Bird from Karennee.

London. The Zoological Society,—Transactions, Vol. 9, Pts. 8 and 9, 1876.

Pt. 8. *Prof. Owen*.—On the Osteology of the *Marsupialia*, Pt. 5.

Pt. 9. *O. Salvin*.—On the Avifauna of the Galapagos Archipelago.

Munich. Königliche Bayerische Akademie der Wissenschaften,—Mathematisch-Physikalische Classe. Sitzungsberichte, Heft III, 1875, Heft I. 1876.

Heft. 1. *v. Bezdold*. Ueber die Vergleichung von Pigmentfarben mit Spectralfarben.

———, ———. Philosophisch-Philologische Classe, Sitzungsberichte Band I, Heft 1 to 3, and Band II, Heft 2 to 4.

———, ———. Mathematisch-Physikalische Classe, Abhandlungen, Band 12, Abth. 2.

Palermo. Società degli Spettroscopisti Italiani—Memorie, Dispensa 12, Decembre, 1876.

Paris. Journal Asiatique,—7^{me} Série, Tome VIII, No. 1, 1876.

St. Petersburg. Hortus Petropolitanus,—Acta, Tomus 4, Fasc. 1 and 2.

———, L'Académie Impériale des Sciences de St. Petersburg,—Bulletin, Tome XX, Nos. 3 and 4; Tome XXI, Nos. 1 to 5.

Tome XXI, No. 1. *J. F. Brandt*.—Recherches sur le lapin (*Lepus cuniculus*), au point de vue zoo-géographique et paléontologique. *A. Sawitsch*.—Observations des planètes à St. Petersburg.

No. 3. *H. Wild*.—Anémomètre muni d'un simple appareil pour la mesure de la force du vent. *O. Bothlingk*.—Notes pour servir à la critique et à l'explication de divers ouvrages Sanskrits.

No. 4. *K. E. v. Baer*.—La mer Carionne mérite-t-elle le nom de glacière? *H. Wild*.—Recherches photométriques concernant la lumière diffuse du ciel.

No. 5. *O. Bothlingk*.—Questions touchant l'orthographe Yakoute. *L. Cienkowski*.—Sur la morphologie des Alotrichies.

———, L'Académie Impériale des Sciences de St. Petersburg,—Mémoires, 7^{me} Série, Tome XXII, Nos. 4 to 10; Tome XXIII, No. 1.

Tome XXII, No. 4. *Dr. W. Gruber*.—Monographie über die aus wahren Cartilagine praeformirten Ossicula Sesamoidea in den Ursprungsgelenken der Köpfe des *Musculus Gastrocnemius* bei dem Menschen und bei den Säugethieren.

No. 8. *W. Dybowski*.—Die Gasteropoden-Fauna des Baikal-Sees.

Vienna. K. K. Geologische Reichsanstalt,—Jahrbuch, Band 26, No. 2.

Dr. Schneider.—Geologische Uebersicht über den holländisch-Ostindischen Archipel.

BOOKS AND PAMPHLETS

presented by the Authors.

GARCIN DE TASSY. La Langue et la Littérature Hindoustanie en 1876, Revue Annuelle. 8vo. Paris, 1877.

LIVESIDGE, A. Mineral Map and General Statistics of New South Wales, Australia. Pamphlet, Sydney, 1876.

MISCELLANEOUS PRESENTATIONS.

KEENE, H. G. *The Fall of the Moghul Empire.* Second Edition, 8vo., London, 1876.

GOVT. OF INDIA, HOME DEPT.

WEBER, A. DR. *Indische Studien*, Band 1-4, Heft 2 and 3.

THE EDITOR.

TRUMPP, E. DR. *Nának, der Stifter der Sikh-Religion.* Pamphlet, 4to. Munich, 1876.

LILJENCRON, FRIEDRICH R. v. DR. *Ueber den Inhalt der allgemeinen Bildung in der Zeit der Scholastik.* Pamphlet, 4to., Munich, 1876.

K. B. AKADEMIE DER WISSENSCHAFTEN ZU MÜNCHEN.

POTT, A. F. *Ueber die Verschiedenheit des menschlichen Sprachbaues und ihren Einfluss auf die geistige Entwicklung des Menschengeschlechts, von W. von Humboldt, mit erläuternden Anmerkungen und Excursen sowie als Einleitung: Wilhelm von Humboldt und die Sprachwissenschaft.* 2 vols, 8vo., Berlin, 1876.

THE PUBLISHERS.

Report on the Administration of Bengal, 1875-76.

Report of the Proceedings of the Second International Congress of Orientalists held in London 1874.

GOVT. OF BENGAL.

Reports and Official Letters to the Kaitakushi by Horace Capron, Commissioner and Adviser and his Foreign Assistants.

K. KURODA, CHOKUWAN OF KAITAKUSHI, TOKYO, JAPAN.

Memoir of the Life of Admiral Sir Edward Codrington, with Selections from his public and private Correspondence, edited by his daughter, Lady Burchier. 2 volumes, 8vo., London, 1874.

UNKNOWN.

PERIODICALS PURCHASED.

Berlin. *Journal für die reine und angewandte Mathematik*,—Band 82, Heft 2.

R. Clausius.—Ueber die Ableitung eines neuen elektrodynamischen Grundgesetzes. *F. E. Prym.*—Zur Theorie der Gammafunction.

Calcutta. *Stray Feathers*,—Vol. IV, Nos. 4, 5 and 6, 1876.

V. Ball.—Notes on some Birds collected in Sambalpoor and Orissa. *W. T. Blanford.*—Notes on the Synonymy of *Spizalauda*. *Capt. G. F. L. Marshall.*—A new Indian *Iora*.

Göttingen. *Göttingische Gelehrte Anzeigen*,—Stück 39—42; Nachrichten, Nos. 17—19, 1876.

No. 18. *T. Benfey.*—Nédiyama, nedishtha.

Leipzig. *Poggendorf's Annalen der Physik und Chemie*,—Band 8, Stück 1. *E. Lommel.*—Die Interferenz des gebeugten Lichtes. *W. Ostwald.*—Volumchemische Studien.

London. The Academy,—No. 244, 1877.

———. The Annals and Magazine of Natural History,—Vol. 18, No. 107.

Capt. F. W. Hutton.—On *Peripatus novae-zealandiae*. P. Tasscher.—On the
Fecundation of the Egg in the Common Fowl. Dr. N. Severtzoff.—The Mam-
mals of Turkestan. Major Godwin-Austen.—Descriptions of supposed new
Birds from the Khási-Nágá Hill-ranges south of the Brahmaputra River, As-
sam. E. J. Miers.—Note on the Genera *Astacoides* and *Paranephrops*. J.
Wood-Mason.—On the Femoral Brushes of the *Mantidæ* and their Function.
On the Geographical Distribution of *Schizocephala*, a Genus of *Mantidæ*.

———. The Chemical News,—Vol. 84, Nos. 882 to 886, 1876.

———. Conchologia Iconica,—Pts. 880, 331.

Cyrena. Risso. Sphærium.

———. The Journal of Botany,—Vol. V, No. 167, November, 1876.

H. F. Hance.—A New Chinese *Arundinaria*. Baron F. von Mueller.—Succinct
Notes on the Affinity of the *Plantaginæ*. J. G. Baker.—On a Second Collec-
tion of Ferns made in Samoa by the Rev. S. J. Whitmee.

———. The Journal of the Society of Arts,—Vol. 24, Nos. 1248 to 1251,
1876 and Vol. 25, No. 1252, 1877.

———. The London, Edinburgh, and Dublin Philosophical Magazine,—
Vol. 2, No. 12, 1876.

E. Sabine.—On a Method of Measuring the Contour of Electric Waves passing
through Telegraph Lines. A. W. Clayden.—The Spectra of Indium. Lecog
de Boisbaudran.—On the Physical Properties of Gallium.

———. The Numismatic Chronicle,—Pt. 3, 1876.

New Haven. The American Journal of Science and Arts,—Vol. 12, No. 70,
1876.

J. D. Dana.—On Cephalization, Pt. 5 : Cephalization, a fundamental principle
in the Development of the System of Animal Life. J. Murray.—Sea-bottom
Deposits observed during the Cruise of the "Challenger".

Paris. Annales de Chimie et de Physique,—Tome 9, 5^{me} Série, Septem-
bre, 1876.

———. Comptes Rendus,—Tome 83, Nos. 14—18, 1876 ; Tome 84,
No. 1, 1877.

No. 14. M. Malin adresse une Note relative au radioscope. M. J. Hen-
ry.—Découverte de la planète (168), (169).

No. 16. M. Ledieu transmet une Note concernant les nouvelles méthodes
proposées pour la recherche de la position du navire à la mer.

No. 17. M. A. Abbadia.—Rapport fait à l'Académie des Sciences sur les tra-
vaux de M. Francis Garnier, lieutenant de vaisseau.

No. 18. M. N. Joly.—Étude sur l'appareil reproducteur des Éphémérides.

———. Journal des Savants,—Septembre, Octobre, 1876.

Octobre. M. Bréal.—La langue indo-européenne.

———. Revue Archéologique,—Septembre, 1876.

———. Revue Critique,—Nos. 40 to 45, 1876.

———. Revue des deux Mondes,—Tome 17, Livraison 4 ; Tome 18, Livrai-
son 1.

Paris. *Revue Scientifique*,—No. 29, 1877.

—, *Revue et Magasin de Zoologie*,—Tome 4, 3^e Série, Nos. 6, 7
1878.

Fieber et Reiber.—Cicadines d'Europe.

BOOKS PURCHASED.

BAKER, VALENTINE. *Clouds in the East: Travels and Adventures on the Perso-Turkoman Frontier*. 2nd Ed. revised, 8vo., London, 1876.

FEER, M. *Étude sur les Jâtakas*.

GORDON-CUMMING, Lieut.-Col. W. *Wild Men and Wild Beasts: Scenes in Camp and Jungle*. 2nd Ed., 8vo., London, 1872.

HOWORTH, H. H. *History of the Mongols from the 9th to the 10th Century*. Pt. 1. *The Mongols Proper and the Kalmuks*. Royal 8vo., London, 1876.

KAYE, JOHN WILLIAM, Sir. *Lives of Indian Officers, illustrative of the History of the Civil and Military Service of India*. 3 Volumes, 8vo., London, 1875.

KELLOGG, S. H., REV. *A Grammar of the Hindi Language; in which are treated the standard Hindi, Braj, and the Eastern Hindi of the Râmāyan of Tulsî Dâs, also the colloquial dialects of Marwar, Kumaon, Avadh, Baghelkhand, Bhojpur, &c., with copious Philological Notes*. Royal 8vo. Allahabad, 1876.

MALLESON, G. B., Colonel, C. S. I. *An Historical Sketch of the Native States of India in subsidiary alliance with the British Government*. With a notice of the Mediatized and Minor States. 8vo., London, 1875.

RAWLINSON, G., Professor. *The Seventh Great Oriental Monarchy or the Geography, History, and Antiquities of the Sassanian or New Persian Empire*. 8vo., London, 1876.

Reports of the British Association for the Advancement of Science for 1870, Liverpool; for 1871, Edinburgh; for 1872, Brighton; for 1873, Bradford; for 1874, Belfast. 8vo., London, 1870 to 1874.

SATAW, ERNEST MASON and ISHIBASHI MASAKATA. *An English-Japanese Dictionary of the Spoken Language*. 8vo., London, 1876.

SAYCE, A. H. *The Principles of Comparative Philology*. 2nd Ed. 8vo., London, 1875.

VINCENT, FRANK, Jun. *The Land of the White Elephant. Sights and Scenes in South-Eastern Asia, a personal Narrative of Travel and Adventure in Further India, embracing the Countries of Burma, Siam, Cambodia, and Cœchin-China*. 8vo., London, 1878.

WUESTENFELD, F. Das Geographische Wörterbuch des Abu 'Obeid 'Abdallah ben 'Abd el-'Aziz el-Bekri, Band 2, Hälfte 1. 8vo. Göttingen and Paris, 1876.

PERSIAN BOOKS PURCHASED.

'Imád-us-Sa'ádat, by Sayyid Ghulám 'Alí Khán.
Tabaqát-i-Akbari, by Nizám-ud-dín.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR MARCH, 1877.

The Monthly General Meeting of the Asiatic Society was held on Wednesday, the 7th inst., at 9 o'clock P. M.

The Hon. Sir E. C. Bayley, K. C. S. I., President, in the Chair.

The minutes of the last Meeting were read and confirmed.

The following presentations were announced—

1. From the Government of Bombay—

The Book of Arda Viraf. By Dr. M. Haug and Dr. E. West, with a Glossary and Index.

Vendidad, translated into Guzerati, by Kavasji Edabji Kanga.

2. From Commander A. Dundas Taylor, Superintendent Marine Survey Dept.—

A list of Light Houses and Light Vessels in British India, including the Red Sea and Coast of Arabia, corrected up to January 1877, by R. C. Carrington.

A Chart of the Madras Roadstead Survey, by Lieut. F. W. Jarrad, R. N. and Mr. P. J. Falle. October 1876.

3. From the authors, copies of the following—

"The Oriental Sore as observed in India;" and "Leprosy in India." By T. R. Lewis, M. B. and D. D. Cunningham, M. B.

4. From the Author, a copy of "The Rámáyana of Tulsi Das, Book 1, by F. S. Growse.

5. From the Rev. F. Foulkes, a copy of "Introduction to the Nannul; The Tamil text and the English Translation." By Rev. H. Bower.

6. From Mrs. Woodrow, copies of back numbers of the Journals of the Society from 1851 to 1873 and of the Proceedings from 1865 to 1875, belonging to her late husband.

The following gentlemen, duly proposed and seconded at the last Meeting, were elected Ordinary Members—

The Hon. Bazett Wetenhall Colvin, C. S.

The Rev. A. E. Medlycott.

The following are candidates for ballot at the next Meeting—

(1.) Rev. A. N. W. Spens, Chaplain, Bengal Establishment, proposed by Colonel A. D. Vanrenen, seconded by Major H. H. Godwin-Austen.

(2.) Irwine John Whitty, Esq., Supdt. of the Khurhurbari Collieries, Giridhi, E. I. R., proposed by Mr. H. B. Medlicott, seconded by Dr. O. Feistmantel.

The following gentlemen have intimated their desire to withdraw from the Society—

Messrs. A. J. Hughes, C. E. and F. C. Daukes, C. S.

The PRESIDENT reported that the Council had approved of the following modification of the proposed rule suggested by Mr. H. F. Blanford at the December meeting, and would recommend it in the usual way to the whole body of Members for adoption.

"Before circulating any question coming under clause (c) of rule 64 for the votes of the general body of Members of the Society, the Council shall cause to be sent to every resident Member, at least 48 hours before the general meeting at which such question is to be proposed, a printed circular in which shall be set forth the nature of the proposal, and the reasons for it, in order that it may be duly discussed at such general meeting. A statement of any objections that may be raised at the meeting against the proposal, shall also be circulated with the voting papers."

The COUNCIL announced that they had appointed Mr. T. S. Isaac a Trustee of the Indian Museum on behalf of the Society, in accordance with the provisions of the new Museum Act which gives an additional Trustee on the part of the Society.

Also that the following gentlemen had been appointed to serve on the several Committees during the ensuing year.

Sub-Committee of Finance.

Dr. T. R. Lewis.

Dr. Rájendralála Mitra.

H. B. Medlicott, Esq.

Colonel J. F. Tennant, R. E.

Library.

Dr. Rájendralála Mitra.

A. Pedler, Esq.

Colonel J. F. Tennant, R. E.

Dr. Mohendralal Sircar.

G. Nevill, Esq.

C. J. Lyall, Esq.

Dr. D. D. Cunningham.

Dr. W. K. Waller.

Bábu Prannath Pundit, M. A.

C. H. Tawney, Esq., M. A.

W. S. Brough, Esq.

Whitley Stokes, Esq., C. S. I.

W. T. Blanford, Esq.
 H. F. Blanford, Esq.
 C. H. Wood, Esq.
 Dr. O. Feistmantel.
 John Elliott, Esq. M. A.
 A. M. Nash, Esq.
 Dr. J. Anderson.

Lieut. F. W. Jarrad, R. N.
 H. H. Locke, Esq.
 R. Parry, Esq.
 Dr. T. R. Lewis.
 H. Beverley, Esq., C. S.
 J. Crawford, Esq., C. S.

Philology.

Dr. Rájendralála Mitra.
 C. H. Tawney, Esq., M. A.
 Major-General A. Cunningham,
 C. S. I.
 J. Beames, Esq.
 F. S. Growse, Esq.
 Rev. K. M. Banerjea, LL. D.
 Bábu Gour Das Bysack.
 Dr. Mohendralal Sircar.

Moulvie Abdul Latif Khán Bahá-
 dur.
 Moulvie Kabiruddin Ahmad Sahib.
 Bábu Dvijendranath Thakúr.
 Whitley Stokes, Esq., C. S. I.
 Bábu Prannáth Pándit.
 Dr. G. Thibaut.
 C. J. Lyall, Esq.
 Bábu Pratápa Chandra Ghosha.

Natural History.

G. Nevill, Esq.
 H. F. Blanford.
 V. Ball, Esq.
 H. B. Medicott, Esq.
 Dr. O. Feistmantel.
 D. Waldie, Esq.
 A. O. Hume, Esq., C. B.
 Dr. D. D. Cunningham.
 Dr. J. Armstrong.
 S. Kurz, Esq.
 Dr. G. King.

S. E. Peal, Esq.
 W. E. Brooks, Esq., C. E.
 Dr. J. Scully.
 Dr. W. Schlich.
 Dr. T. R. Lewis.
 R. Lydekker, Esq.
 W. T. Blanford, Esq.
 Major H. H. Godwin-Austen.
 Capt. G. F. L. Marshall, R. E.
 Dr. J. Anderson.
 Lieut. F. W. Jarrad.

Physical Science.

Col. H. L. Thuillier, C. S. I.
 H. B. Medicott, Esq.
 H. F. Blanford, Esq.
 D. Waldie, Esq.
 A. Pedler, Esq.
 R. S. Brough, Esq.
 Dr. D. D. Cunningham.
 Dr. T. R. Lewis.
 Major H. H. Godwin-Austen.
 A. Cappel, Esq.

T. S. Isaac, Esq., C. E.
 Col. J. F. Tennant, R. E.
 Commander A. D. Taylor.
 Dr. O. Feistmantel.
 R. Lydekker, Esq.
 V. Ball, Esq.
 Col. D. G. Robinson, R. E.
 Rev. F. Lafont.
 J. O'Kinealy, Esq.
 W. T. Blanford, Esq.

C. H. Wood, Esq.

A. M. Nash, Esq., M. A.

Dr. J. Scully.

W. D. Bruce, Esq., C. E.

J. Elliott, Esq., M. A.

Coins.The Hon. Sir E. C. Bayley,
K. C. S. I.Major-General A. Cunningham,
C. S. I.

Col. J. F. Tennant, R. E.

Col. F. W. Stubbs, R. A.

Dr. Rájendralála Mitra.

Rev. M. A. Sherring.

The PRESIDENT exhibited to the meeting the portrait of the late Dr. Stoliczka, which had just arrived from England, together with a copy of a photograph of it by the Woodbury process, of which a copy would be presented to every subscriber to the Fund, and read the following extract from a letter of Mr. A. Grote on the subject :

"I enclose you a photo. of Dickinson's portrait of Stoliczka, which is now in King & Co.'s hand for shipment to Calcutta. The print is I think fairly satisfactory, it is from a second negative taken from an unsuccessful print which I had touched up by an artist under Dickinson's supervision. The cost of the work therefore will be some £4 over the original estimate. Geflowski's second model for the bust seems to have been approved by Oldham, Hyde and Medlicott, and he is now proceeding with the work in marble."

The SECRETARY read an extract of a letter from Mr. W. H. Dall, of the United States Coast Survey, to his father, the Rev. C. H. Dall, M. A., announcing the death of Mr. F. B. Meek, the celebrated American Palæontologist.

Dr. FEISTMANTEL said—On the 21st December, 1876, died at Washington, Mr. F. B. Meek, the excellent Palæontologist of the United States Geological and Geographical Survey under the direction of Prof. Hayden. He published a great many important papers treating on the most various subjects of zoological palæontology, from almost all formations in different countries. These papers were published by him partly alone, partly in company with Mr. T. Hall, Mr. T. V. Hayden and lately with Mr. A. H. Worthen.

His palæontological papers are contained in different American Journals and Proceedings of Societies, but the most important are in the Survey papers, *vis.*, in the publication on the Geological Survey of California, Vol. I. 1867, on Carboniferous and Jurassic Fossils (with 8 Plates) ; in the papers on the Survey of Illinois, Vol. II, 1868, Description of Invertebrates from the Carboniferous System, by F. B. Meek and A. H. Worthen—(with many plates) ; Vol. III, 1868, Palæontology of Illinois, by Meek and Wor-

then. In the paper on the Geological Survey of Ohio, Vol. I, 1873, he described the Invertebrate Fossils of the Silurian and Devonian systems of Ohio, with 23 Plates, and, only a short time before his death, he completed his great work on Cretaceous and Tertiary Invertebrate Fossils of the Upper Missouri country in one large quarto volume. His death is certainly a great loss to American palæontology and to science altogether. These few notes would be sufficient to show his thorough knowledge of Zoological Palæontology in all its branches, but it was to be hoped that a more complete biography of Mr. Meek would be given hereafter.

The PRESIDENT announced that arrangements had been concluded for obtaining a memorial bust of Dr. Oldham by Mr. Geflowski.

The SECRETARY read an extract from a letter from the Vice-Presidents, Hofrath von Hauer, Director of the Imperial Geological Institute, and Hofrath Brunner von Wattenwyl, and Herr Döblhoff, Secretary, stating that they had established a Scientific Club at Vienna, (9, Eschenbach Gasse) and hoped that Members of the Asiatic Society would become guests or foreign members of the Club when they came to Vienna.

On the proposal of Mr. H. F. Blanford, seconded by Col. H. L. Thuillier, C. S. I., a vote of thanks to the Club for their kind and hospitable invitation was unanimously agreed to.

Dr. RĀJENDRALĀLA MITRA submitted to the inspection of the meeting a copper-plate grant sent to him for examination by Mr. E. T. Atkinson of Allahābād. It had been obtained from the Rāwal of Badrināth, resident at Pāndukēsvar through Sir Henry Ramsay. It measures 24 by 16 inches, and has a scalloped head on the left side, 5 inches high. In the middle of the head is let in a thick lead seal, 3 inches in diameter, about half an inch of its side standing above the surface of the plate, and projecting a quarter of an inch behind. The seal bears the figure of a bull couchant in bas-relief, and a legend in two lines of writing in relief. The inscription on the plate, extending to 29 lines, runs lengthwise from end to end, the last line being in several places detached, and the spaces filled up by ornamental scrolls, representing longitudinal halves of serrated leaves. The letters are of the Kuṭiḷa type, and the language is Sanskrit. (Plate I.)

The subject of the record is the gift of two wards (*palli*), one named Khāsiyaka in the sub-division or village of Saurunnośā, and the other named Guggula in the subdivision or village of Pānibhuti, both situated in the district (*viśaya*) of Kārtikeyapura, to a Brāhman named Pārāyana Bhāṭṭāraka, for the worship of a goddess in the village of Saurunnośā. The grant was made on the day when the summer solstice began, on the 3rd

of the wane in the month of Māgha, Samvat 21st year of the king's reign. The record was composed by Ayata, the minister of war and peace, written out by the secretary or chief scribe Yijaka, and inscribed by one Gangabhādra. The donor was a king named Lalitasuradeva, son and successor of Ishtaganadeva, by Vegadevi, and grandson of Mimbara. The conveyancer is most lavish in his praise of the three kings, and has showered a large number of epithets in praise of them; but he affords no clue to the country over which the kings reigned. The date, though called Samvat, is obviously not intended for the era of Vikramāditya, as it is preceded by the epithet *pravardhamāna-vijya-rājya-samvatsara* which can only refer to the reigning sovereign. The character is unmistakably of the 10th century, and that is the date which can reasonably be assigned to the record. The legend on the seal repeats the genealogy as given in the body of the record.

Transcript of an inscription from Pāṇḍukeśvar near Baidyānth.

- (१) स्वस्ति श्रीमत्पार्त्तिकेयपुरात्मजनामरदिततनुजमनुजविभुभक्ति-
भावभरभारानमितामितोत्तमाङ्गसङ्घिविकटमुकुटकिरीटविटङ्गको-
टिकोटिशेलोकता—
- (२) नामा(ताता)यकप्रदीपदीपदीधितिपानमदरत्नचरखकमनामनविपु-
नवज्जनिदयकेशरासारसारिताश्रेवविश्वेश्वशोविघनतनसोजससख-
भुङ्गीधौतजटाजू—
- (३) तस्य भगवतो धूर्जटेः प्रसादान्निजभुजोपार्जितैर्जितमिर्जितरिपु-
तिमिरजम्बोदयप्रकाशप्रदयादाक्षिण्यसत्त्वसत्त्वश्रीश्रीश्रीदावंग-
म्बोर्धमर्थादादृष्टाचार्य—
- (४) कार्यवर्षादिगुणगणान्ततश्चरीरः महासङ्गतिसन्तानवीजावतारः क-
तयुगागमभूपाजनिजनीर्तिः मन्दाभगवतीचरखकमनजनासनाय-
मूर्तिः श्रीनिम्बरकस्य त—
- (५) गयकत्यादानुधातो राज्ञी महादेवी श्रीनाम्देवी तस्यानुत्पन्नः परम-
माहेश्वरः परमब्रह्मणः श्रितकृपायधारोत्पन्नमतेभक्त्याकटोत्पु-
नृक्तावशीवशःपताका—
- (६) श्वायचन्निवापहसिततारावः परमभट्टारकमहाराजाधिराजपर-
मेश्वरश्रीमदिकुमरदेवकस्य पुत्रकत्यादानुधातो राज्ञी महादेवी
श्रीवैजदेवी तस्यानुत्पन्नः परमना—

- (८) ऐश्वर्यः परमप्रसादः कश्चिन्नकृपयातन्ममधरपुत्रादचारितधौरे-
यवदवराहचरितः सहजमतिविभवविभुविभूतिस्त्रिगितादातिचक्र-
प्रतापदहनः । अतिवैभवसंहारात्मकं—
- (९) अतमीमभ्रकुटिकुटिकसेरिसटाभीतभीतारातीभकनभभरः अह-
न्नायकपायवायगुणप्रायगवहठाकटोत्पृष्टसकीनजयनक्षीप्रथमस-
मानिक्रमावलो—
- (१०) कनकनक्षसखेदसुरसुन्दरीविधूतकरलनद्वयकुसुमप्रकरप्रकीर्णव-
त्तंससम्बर्द्धितकीर्तिवीजः पृथुरिव दीर्घसाधितधनुर्मखनकावह-
म्भव—
- (१०) वशीकृतगोपाकनानिचकीकृतधराधरेन्द्रः परमभट्टारकमहाराजा-
धिराजपरमेश्वरमीनक्षितशूरदेवकुशलो अस्मिन्नेव श्रीमत्प्राप्तिर्मे-
यपरविषये समु—
- (११) पगताम् सम्मानवनियोगस्थान्द्राजराजतकराजपुत्राह्वानात्मकसाम-
न्तमहासामन्तकुरमहामनुज्यमहाकर्तृकतकमहाप्रतीहारमहाद-
खनायकमहाराजप्रमातार—
- (१२) रभङ्गकुमारानाथोपरिकदुस्त्राभ्यासाधनिकदशपराधिकचौरोद्धर-
विक्रमैश्वर्यकर्मैश्वर्यकतदायुक्तविनियुक्तपट्टाकापचारिकाश्रेयभ-
ङ्गाधिकृतहृष्यभोद—
- (१३) वनव्यापृतकभूतप्रेषविकदखिकदखपाशिकममागमिघाङ्गिकाभिलर-
माखकराजस्थानीयविवयपतिभोगपतिनरपञ्चपति + खरकप्रति-
शूरि—
- (१४) कल्याणाधिकृतवर्त्मपाकनौकृपाकवट्टपाककोवपाकप्रान्तपाकनिशोर-
वरवाजोमहिव्यधिकृतमहामहत्तमाभीरवविक्रमेतिपुरोगाकटादश-
प्रह—
- (१५) अधिकाणीयान्कवकिरातप्रविठकनिङ्गशौरङ्गयोद्धामेदाम्बुवाखान-
पर्यन्ताम्सम्सम्सास्मसमजनपदागभटापठसेवकादीनव्याच कीर्ति-
सागकीर्तिसाग—
- (१६) त्पादपश्रोपजीविनः प्रतिवातिनश्च ब्राह्मणोत्तरान् वषाहं मत्तवति
वोधवति समान्नायकवत्सु तेकादिदितमुपरिनिर्दिष्टविषये गोवत्त-
वार्त्ता प्रतिवत्तवधियाक—

- (१०) परिभुज्यमानपक्षिका तथा पक्षिभूतिकायां प्रतिबद्धगुण्यपरिभुज्य-
मानपक्षिकादयं यत्ते मया मातापिनोरात्मनश्च पुण्यवशीभिहृष्टये
पवनविघटिता—
- (१८) न्यय्ययचवचतदङ्गजीवलोकात्मवलोकाश्च जलवुदुदाकारमसारं वायुदं-
द्वा गजकनभक्त्यायचयकताञ्चाञ्च त्वापरलोकिनिःश्रेयसार्थसंसारा-
र्यवोत्तरवार्यञ्च
- (१९) पुण्येहनि उत्तरायणसङ्गान्तौ गन्धपुष्पधूपदीपोपजेयनैवेद्यवनिच-
न्दनमेयवाद्यसत्त्वादिप्रवर्तनाय लब्धस्फुटितसंस्काराय अभिनवक-
र्म्मकरणा—
- (२०) यच्च न्यय्ययदमूकभदद्याच्च गोवत्ससायां महादेवीजीसामदेया
स्वयंकारयितभगवते श्रीनारायणभट्टादकाय शासनदानेन प्रति-
पादिताः प्रकृतिपरिहारयुताः
- (२१) प्रकाशाभटाप्रवेशः क्षितिचित्रगङ्गाः क्षणाच्छेष क्षात्रज्जाकर्म्मकितिक्षि-
तिसमकालिकः विषयादुद्भूतपिण्याख्यसीमागोचरपर्यन्तस्य वक्षारा-
मो ऋद्रप्रचययोपे—
- (२२) तदेवमाख्यभूतभुज्यमानवर्जिताः यत्स्वखं पादपर्येय परिभुज्यत-
न्माख्योपरिनिर्दिष्टैरन्यतरैर्वा चरयविधायपरिपन्थिजनादिकोप-
प्रवो मनागपि न कर्त्त—
- (२३) सो गान्ध्या - - महाज्जोहः स्यादितिप्रवर्द्धमानविजयराज्यसम्पत्सर-
यकविंशतिसे सन्वत् २१ माघवदि ३ - - - महादानाक्षयपठकाधि-
कृतजीपीमकः । चि—
- (२४) खितमिदं महासन्धिविग्रहाक्षपठकाधिकृतजीमदायटावबनाठहो-
त्वीर्वा श्रीगङ्गभजेय । वडभिर्वास्तथा भुक्ता राजभिः सगरादिभिः ।
वस्य वस्य वदा भूमिस्त—
- (२५) स्य तस्य तदा यच्च । सर्वानेतान् भाविनः पार्थिवेभ्यो भूयो भूयो
वाचते रामभद्रः । सानान्धोऽयं धर्म्मसेतुर्धपायां कविकाञ्च पाच-
नीयो भवद्भिः । खदत्ता परदत्ता वा यो ह—
- (२६) रेत वस्तुवरा । वदित्ववसहकावि चविद्या जायते क्षमिः । भूमे-
दावा वाति योके सरावां चलेर्दुर्लभं धानमावह्य दिवं योके कुम्भी
तैवपूर्वे सुतते । भूमेर्ह—

- (२०) तौ पश्यते काकद्वतैः । बहिवर्धसहस्राणि शर्मे तिष्ठति भूमिदः ।
 आच्छेता चागुमन्ता च ताभ्येव नरके वसेत् ॥ गानेशाय सवर्षाय
 भूमेरप्येकमकुलं । ह्यत्वा नरकमायाति यावदाह्नतिसंज्ञवं । दानीह
 दत्तानि पुरा नरेन्द्रैर्दानानि धर्मार्थयशस्कराणि । निर्माज्यवन्ति
 प्रतिमानि तानि को नाम साधुः पुनराददीत । — — —
- (२८) धमनिदं समुदाहरद्विरन्येष दानमिदमभ्यनुमोदनीयं कक्ष्याकुडि-
 त्पुनिकवुदुदचक्षयायाः । दानं यत् परयशःपरिपाजनम् ॥ इति
 कर्मकदम्—
- (२६) विन्दुजोषमिदमनुचिन्त्य मनुष्यजीवितम् । सक्कमिदमुदाहृतम्
 बुद्ध्या न हि परवैः परकीर्तयो विजोप्याः ।

Legend on the Seal.

श्रीनिम्बरक्तपादानुध्यातः ।
 श्रीमदिष्टगणदेवः तत्पादानुध्यातः ।
 श्रीमल्लकितमूरदेवः क्षितीशः ।

The following papers were read :—

1. *Note on the Variation of the Barometric Tides in connection with diurnal Land and Sea Breezes.*—By HENRY F. BLANFORD.

(Abstract.)

Mr. H. F. Blanford said that one of the commonest and most familiar illustrations of convection currents, given in Manuals of Physics and Meteorology, is that of the diurnal land and sea breezes. During the morning hours the solar heat falling on the land, heats and expands the air resting on its surface to a much greater extent than that resting on the sea. Supposing then, that previously to this heating, the several strata were in equilibrium, the result must be, that the isobaric planes will be disturbed and made to incline towards the sea. At the ground surface this disturbance will be very small, but will increase with increased elevation. A further consequence will be that, above a certain level, a current of air will flow from over the land to the sea, raising the pressure over the latter, and, at the sea surface, raising it above the pressure on the land surface. A return current will be generated in the lower strata of the atmosphere, especially during the afternoon, and this constitutes the well known sea-breeze. At night, owing to the cooling and contraction of the air over the land, all these actions will be reversed. The isobaric planes will incline

towards the land, an upper current flow in the same direction and the pressure at the land surface being exalted by this access of air, over that at the sea-surface, a land wind will be produced blowing towards the sea. If then this theory be true we ought to find a greater pressure over the land in the early morning, over the sea in the afternoon. Hitherto, however, there had been no means of verifying this inference and so verifying the theory. This verification had lately been supplied by data furnished by the log books collected by the London Meteorological office, copies of which (relating to Indian Seas) had recently been made for the Indian Meteorological office, under the sanction of the Secretary of State, and with the permission of the Meteorological Committee of the Royal Society. The logs as yet received, related only to the month of January. On extracting from them the barometric observations made at intervals of 4 hours, between N. lat. 20° and the Sand Heads (lat. 21° 3'), and taking the means of all those made at corresponding hours, the result showed with considerable accuracy the daily oscillation of pressure at an average distance of 70 miles from the land, since the observations were sufficiently numerous to eliminate all temporary irregularities of importance. When the curve representing the diurnal oscillation was computed from these data by Bessel's interpolation formula, and compared with that of Calcutta for the same month, it was found that the mean pressure of the two places being assumed to be equal, the pressure at the land station was in excess from 1 A. M. to 1 P. M. and that given by the ship observations in excess from 1 P. M. to 1 A. M., thus offering a very satisfactory verification of the theory just sketched out.

2. *The Kaimúr Range.*—By CHANDRA SEKHARA BANARJI.

(Abstract.)

The author describes the principal geographical and geological features of the Kaimúr Mountains. The range is called by the natives and in the Puránas 'Vindhya-mali' to which properly speaking it also belongs. Another name for it is *Kairo-mali*, 'the range of the Kaira-Des,' and it is probable that the word 'Kaimúr' is a corruption of 'Kairomali.'

The legend connected with the Karamnáśá and Son rivers are given, and the paper concludes with a description of several shrines near Rohtás-garh. The author also gives two inscriptions, of Samvat 1178 and 1271.

The paper will be printed in No. 1, Pt. I, for 1877.

3. *Description of Ruticilla Shisticeps.*—By W. T. BLANFORD, Esq., F. R. S.

This paper will appear in the Journal, Part II, with a coloured Plate.

4. *On Giants'-Kettles (pot holes), caused by water action in streams in the Rajmahal Hills and Barakur district.—By DR. O. FEISTMANTEL.*

(Abstract.)

Giants'-Kettles, or 'pot holes' as they are described in Handbooks on Geology and Physical Geography, are more or less regular cavities of various sizes in diameter and depth, excavated in all sorts of rocks. They were first described from Sweden, in 1769, and later from other localities; and various mythic stories were brought into connection with them in former times.

But while in most cases the Giants'-Kettles were shown to have been produced by running water, by cataracts in streams, &c., and to be of recent age only, yet for some others another time and cause was assigned, and they were found to have their origin in that post-tertiary time, which is termed the glacial period—and from this point of view they are certainly of geological interest.

As the author had observed the same forms in two different localities in Bengal, and as there is, so far as he knew, only one case from India recorded, he thought himself justified in describing those cases he had himself observed. They are a contribution to those forms which are produced in present times, apparently by running water in streams, and will certainly not be without interest especially for geologists in Europe, where similar forms are better known and thought worthy of description.

Last year he observed Giants'-Kettles in the Rajmahal Hills, in the Bansloi Nuddee, E. S. E. from the village Amrapura. In the Rajmahal district this river runs in a bed of trap-rock, which is often very hard, and in this rock also the pot holes are excavated.

At the time when he visited this place, there were two complete pot-holes in the river bed, with circular apertures and pretty deep; one was larger than the other, the diameter of its aperture being 90 c. m., the depth 120 c. m.; the other one measured 98 c. m. in diameter and 60 c. m. in depth. Both were polished inside and shewed circular ridges, which might indicate certain periods of excavation. In one of them there was water at the bottom, in the other one a heap of sand.

Close to these were two others, through which at that time water was flowing, having a distinct "affluent" and "effluent" channel, and producing a regular whirlpool in the cavity, in which sand and small pebbles were rolling round; there was no waterfall, the water flowing quite horizontally. They shewed the same conditions as the other ones only that they were not yet so deep, but clearly indicated the way in which the others also were produced. During the rainy season when the river is high, the force of the running water is much more rapid and larger pebbles are

driven in and rolled round—and this especially causes the excavation of the holes. The rock all round was more or less polished, showing various holes unfinished or just begun. The river-bed was very regularly longitudinally furrowed and polished, in the same way as is generally ascribed to ice action, but in this case undoubtedly, only by the force of the *running* water, in which sand and stones are carried down.

This year he had observed similar forms in the Bārākūr district, near Nirsha (6 miles west of Barākūr), in the Kudi-Nuddi. Here the sandstone of the conglstrata crops up in many thick ridges and immense blocks lie about, which from their polished surfaces and polished edges show, that they must have been carried there by the stream. It was in three of these blocks that he observed the Kettles. They were all complete, the dimensions were the following:

1. Aperture of diameter 60 c. m., depth about the same. 2. Dimensions almost the same. 3. The longer diameter 76 c. m., the shorter one 70 c. m., and the depth 85 c. m. The other conditions were the same as in those in the Rajmahal Hills.

In this locality also there is no doubt that running water, and not a cataract, caused the pot holes, and that the excavation is still in progress, especially in the rainy season.

In one of these pot holes in the Kudi-Nuddi there was a heap of sand and round pebbles, in another some water on the bottom.

There is therefore not the least doubt but that these forms are caused by running and whirling water only, without the aid of cataracts; and some phenomena, especially the polished surface of the rocks and the longitudinal furrows in the river bed in the Rajmahal Hills are not at all unlike those which are described as produced by glaciers, although this cause cannot be thought of at all.

Of the reported cases from other countries the most important are enumerated in the paper and the different ways of explanation are given.

Among these are the cases reported by Mr. Jackson from New-Hampshire; (1844), by Mr. Martins from the Chamonix valley (1844); by M. Collegno from South France, in the Tarn River (1844); by Mr. Helmersen from Finland (neighbourhood of the lake of Ladoga &c.,) (1867); by Messrs. Böger and Reusch from near Christiania (1874) &c.

From India only one case is reported, as far as the author knew, by the Missionary Mr. Krick from the river bed of the Brahmaputra, near the Tibetan boundary (1857). Major Godwin-Austen, however, informed him that he has seen similar forms to these in the Naga-Hills, some of them very deep and narrow.

Mr. H. F. BLANFORD said that one of his earliest recollections as a student of Geology was precisely that explanation of the formation of pot

holes which Dr. Feistmantel had brought forward, and up to the present moment he had been unaware that any competent geologist had questioned its validity. The phenomena was indeed exceedingly common and its explanation generally obvious. The most striking circumstance connected with pot-holes was the great depth they occasionally attain to, with a very small diameter.

Dr. FEISTMANTEL said he doubted very much whether Mr. H. F. Blanford's statement, that these pot-holes are exceedingly common, is correct; otherwise they would have been more frequently noticed and described, and authors like Nordenskjöld, Jackson, Collegno, Kutorga, Helmersen, Böger and Reusch would not have devoted special papers to their description; and if they were so very common in India, some of the Officers of the Geological Survey, who visit different parts of India, would have observed them and we should find altogether more information about them—if, however, it was a fact that they are so common he would be very much obliged to Mr. H. F. Blanford if he could furnish him with more positive information about their occurrence, their size, &c., than is contained in the simple assertion "that they occur" which could be found in any Handbook of Geology, he did not, however, consider this general description sufficient, especially when he saw that the authors above named had devoted special monographs to these phenomena and taken the trouble to explain the different causes of formation, which they certainly would not have done if pot-holes had been so common, or always so apparent as Mr. Blanford seemed to think, and he would recommend these papers to Mr. Blanford's consideration.

As regards the occurrence of pot-holes in European streams, it is certain that they are not quite so common; Dr. Feistmantel had himself* visited many streams but had seen no pot-holes and the few scattered communications about them would show that they are not so frequent, except only in certain regions.

The chief point Dr. Feistmantel intended to be shown in his paper, was that the polished surfaces of the rocks and the longitudinal furrows, were, in the cases noted, produced by water action and not by ice; and in the paper he also shows still another cause of polishing and scratching and gives some notes regarding a glacial time in the Talchir (Damuda) period.

To Mr. Blanford's questions whether there were any pot-holes explained by glacier action he would reply that he did not mean that they were produced by glacier action, but that the origin of some of them is put back so far as to the times of the glacial period—and this is indeed so, as shown in Messrs. Böger and Reusch's paper on Giants'-Kettles from near Christiania.* The great Russian geologist, Mr. Helmersen, also speaks of

* Quart. Journ. Geol. Soc. 1874., p. 750, und Zeitschrift der Deut. Geol. Ges. 1874, p. 788, Pts. XXII—XXVIII.

some of the pot-holes described by him as produced during the diluvian period.*

The explanation brought forward by Mr. Blanford, is the same as Dr. Feistmantel intended to show in his paper and he had never doubted it, but it is not, however, always so simple; and, as he had said distinctly, his observations were a contribution to those instances of pot-holes produced by running water. Another reason he had for describing the pot-holes was to show the other phenomena combined with them, especially the polished surfaces of rocks and longitudinal furrows in the river bed, which resemble so much those produced by glacier action, though they are here apparently produced by water only. Polished and scratched surfaces are not therefore always to be considered as necessarily produced by ice action.

He was much interested in this question and would be greatly obliged to any body who would give him positive information (measurements and, if possible, drawings) about the pot-holes in India.

Dr. RÁJENDRALÁLA MITRA remarked that the excavations shown on the plates laid on the table were very like what he had seen on the Ásvathámá rock at Dhauli near Cuttack, at Khandagiri and at Behar. Similar excavations had been noticed by antiquarians at Girnár on the western coast, and in the neighbourhood of other ancient sites of Buddhist monasteries, and they had hitherto been believed to be artificial. Major Markham Kittoe took the Ásvathámá excavations for mortars in which the Buddhist monks, he thought, used to pound medicines for men and cattle. This opinion had been accepted by James Prinsep. Dr. Mitra could not make out from the drawings the size of the holes, but those he had seen were from one to two feet in diameter and eight to ten inches in depth.

Mr. H. F. BLANFORD observed that Dr. Rájendralála Mitra probably referred to something quite different from pot-holes.

The PRESIDENT remarked that he recollected a similar hole worn in an isolated boulder or block of granite lying in the bed of the Sutelj, near the Waughton bridge over that river in Kumaon. The block stood considerably above the present ordinary water level and probably formed part of a fall of rock which had at some former period fallen into the river and dammed the water to a higher level; this block was pierced by a hole reaching from the surface to near the bottom, and the impression on his mind at the time was that it had clearly been bored out by a pebble working in an eddy when the river was at a higher level. But it was many years since he had seen this block.

* See Holmseren: Das Vorkommen und die Entstehung der Riesenlöcher in Finnland; Memoires de l'Acad. Imp. de St. Petersburg, 1867, Vol. XI, Ser. 7^e with 3 plates. Also Vogt, Geologie, Bd. II., p. 191.

5. *The Mythic History of the God Viráj.*—By G. S. LEONARD.

(Abstract.)

The divine personage of Viráj—self manifest, who forms one of the ten supernatural beings, and objects of adoration, in the scale of the creative agents, the Demiurgoi of the Vedanta and Platonic theories, is considered in the various lights of history, mythology, and theology, in all of which he makes a conspicuous figure in the Hindu scriptures.

Though the discordant and contradictory accounts given of his genesis, and of his historical and mythological traditions in the Puránas, make it extremely difficult to form a correct idea of his personality, he is, however, historically found to be the first male being in creation, and in that respect stands in the relationship of the progeny of Brahmá, the great creator of the universe and progenitor of Manu, and other patriarchs of mankind called by their patronymic Vairájás. He is mythologically identified with the Hindu Trinity composed of Brahmá, Vishnu, and Sivá, and sometimes of Ganesha also, of which some instances are adduced from the Sástras. He is theologically described as one of the manifestations of the hypostases or attributes of god inherent in nature, as its vivifying principle. He is further considered in a philosophical light as the automaton, the motive power or moving force of nature, and his poetical and mystical representation as the *anima mundi* the mundane soul, and that of his consort Satarúpá (centiforma), as *corpus mundi* or body of the material world, is also shown, and identified with Múla-prakrit or primary matter, or plastic nature of Sánkhyá philosophy and the goddess Sakh of mythology. Virájism is then vindicated against the charge of Pantheism, idolatry or any kind of material worship, and his religion is proved to be a purely mental one, and he himself is shown as an object of spiritual worship among all Bráhmans, as the God of Nature, apparent in the universal frame without any visible image or temple dedicated to him, except the human heart which alone is endowed with the power of receiving his infinite and glorious image and reflection.

The modification of Viráj into mahá and kshudra or major and minor forms, is also considered, in comparison with the theories of macrocosm and microcosm of European philosophers.

At the close of the meeting the PRESIDENT read the following extract of a letter from Mr. Grote and announced that the Council had agreed to accept Mr. Moore's kind offer and had asked Mr. Grote to be so good as to arrange for the publication of an extra part in London in the same manner as had been done with the Blyth Catalogues.

London, January 31st.

MY DEAR WATERHOUSE,—The question on which I told you last week that I should address your Society's Council concerns the publication of the novelties which have been found in our late friend Atkinson's Cabinet of *Lepidoptera*. The entire collection has gone to Germany, having been purchased by Standinger of Dresden, who has, however, left with Moore of the Indian Museum a selection of novelties among the Nocturnals, with a view to their being named and described. The comparatively few novelties among the Diurnals have fallen into Hewitson's hands and some of these have already been described in the Entomologist's Monthly Magazine for December.

Moore tells me that he finds some 650 species of Nocturnals for description thus:

Bombyces,	200
Noctum,	200
Geometridæ,	200
Pyalidæ,	50

on the first of these groups he is already engaged, but it will take him some time to work out so many new species. The India Office catalogues having been for a time suspended he has asked me whether your Society would undertake to publish his descriptions as a memorial of your late Secretary. He estimates the cost of such a publication at about £142, which includes that of 8 plates uncoloured. Moore, who edited the Horsfield official catalogues and is well up in Indian entomology, offers his editorial labours gratis. I too offer my assistance in seeing the work through the press, and will endeavour to find materials for a short notice of Atkinson's scientific career and of his publications in the Zoological Society's Proceedings, to form an introduction such as I contributed to your Extra number for Blyth's Burmah catalogues. I have rather regretted that the labours of such a zealous collector of Indian *Lepidoptera* should appear to be overlooked by the Society which he so long served. Doubtless many of his discoveries would have been long ago made known through the Society's Journal if he had more leisure and fuller access to the figures of already described species. It is still open to the Council by accepting Moore's offer to secure for the Society and for Atkinson's Memorial the credit of first making his discoveries known to the entomological world.

LIBRARY.

The following additions have been made to the Library since the Meeting held in February, last.

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Dis. 4. *Salvadori*.—Intorno al tipo della *Goura Scheepmakeri*, Finsch, ed agli esemplari del genere *Goura* raccolti dal D'Albertis nella penisola orientale della Nuova Guinea, ed attribuiti alla medesima specie. Intorno alla identità Specifica del *Sericulus xanthogaster*, Scheg. o del *Xanthomelus aureus*. Lin.

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No. 72. *O. N. Rood*.—Experiments on the nature of the force involved in Crookes' Radiometer. *J. W. Dawson*.—On a Recent Discovery of Carboniferous Batrachians in Nova Scotia. *O. C. Marsh*.—Principal Characters of the American Pterodactyls.

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No. 22. *F. A. Abel*.—Sur la composition du coton-poudre. *M. F. S. M. van der Willigen*.—De la force portative des aimants en fer à cheval. *M. Fordos*.—Deuxième Note sur la recherche de la fuchsine dans les vins. *M. A. Pierrot*.—Recherches sur l'origine réelle des nerfs de sensibilité générale dans le bulbe rachidien et la moelle épinière. *M. E. Duclaux*.—De l'action physiologique qu'exercent sur les graines de vicia à soie, des températures inférieures à zéro. *M. J. Chatin*.—Sur la structure du bâtonnet optique chez les Crustacés. *M. E. Ferrière*.—Observation de trombes descendantes faite au cap d'Antibes, le 21 Novembre 1876.

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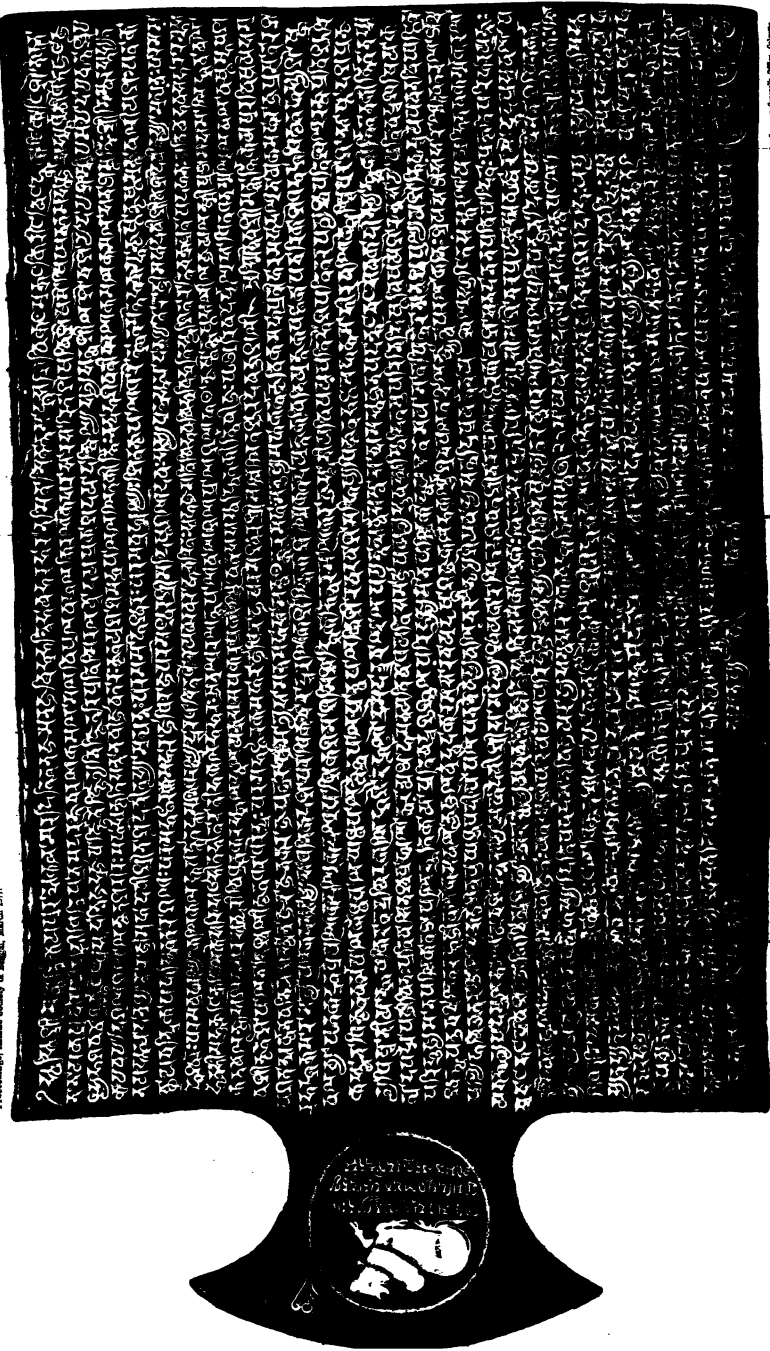
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FACSIMILE OF A COPPER PLATE GRANT FROM PANDUKESVARA.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL.

FOR APRIL, 1877.

The Monthly General Meeting of the Asiatic Society was held on Wednesday, the 4th April, at 9 P. M.

DR. T. R. LEWIS in the Chair.

The Minutes of the last Meeting were read and confirmed.

The following presentations were announced—

1. From the author, a Historical and Statistical Memoir of the Gharipur District, Pt. II. By Dr. W. Oldham, C. S.

2. From Capt. A. D. Taylor, Supdt. Marine Surveys, a Chart of Salang Island, (Junk Seylan) surveyed by Commander A. de Richelieu, H. M. S. Siamese Navy.

3. From Bábu Jogesh Chunder Dutt, twelve copper Coins, collected from Sarnáth, Banáras, and the Panjáb.

Mr. BLOCHMANN said that the copper coins presented by Bábu Jogesh Chunder Dutt did not require particular notice. The oldest was a Bactrian copper coin, and the most recent a piece struck by one of the kings of Audh.

The following gentlemen duly proposed and seconded at the last Meeting were balloted for and elected ordinary Members—

I. J. Whitty, Esq.

The Rev. A. N. W. Spens.

The following are candidates for ballot at the next Meeting—

1. Mr. J. A. Bourdillon, C. S., Offg. Asst. Secretary to the Government of Bengal, proposed by Mr. C. J. Lyall, seconded by Mr. J. O'Kinsale.

2. Mr. W. Sandford, Head Asst. Office Chief Engineer, P. N. S. Railway, Lahore, proposed by Mr. M. Macauliffe, seconded by Mr. J. Gouldsbury.

The Hon. T. E. Ravenshaw, C. S., proposed by Colonel H. L. Thuillier, C. S. I., seconded by Capt. J. Waterhouse.

The following gentlemen have intimated their desire to withdraw from the Society—

Colonel H. Drummond, R. E.

Major Lord Ralph Kerr.

Mr. G. Nevill, (on leaving India).

Bábu Bhagabati Churn Mallik.●

Owing to indisposition Mr. W. T. Blanford was unable to exhibit, as announced, the specimens of pottery, copper ornaments, flint flakes, &c., sent by Capt. Mockler from Balúchistán.

Mr. Blochmann exhibited several Arabic and Persian inscriptions, of which rubbings had been received from Mr. J. G. Delmerick, Dihlí, and Mr. J. B. Reid, C. S., A'zamgarh.

He said—The rubbings received from Mr. Delmerick formed two sets, one taken at Hicár Fîrúzah, and the second, at Hánsí. The latter would be laid before the Society at the next meeting. Mr. Reid's rubbings were taken from various places in the district of A'zamgarh, and as nearly every village of the district had been visited by Mr. Reid, he was sure that there were no other inscriptions to be found there.

Hisár Fîrú'zah.

The town of Hicár Fîrúzah was founded in 757 H., or A. D. 1356, by Fîrúz Sháh III. of Dihlí, at a place formerly called Aráman, or, according to some MSS., Rás, in connection with his canal. Below the castle of the new fort (*hisár*), he made a wide reservoir, and filled it with water from his canal. *Vide* Cunningham, Arch. Reports, Vol. V, p. 142.

According to the *Zafarnámah*, Hisár Fîrúzah was visited by Timur on the 5th Rabí' I, 801 (15th Nov. 1398), who on the same day proceeded to Sarsutí, now called Sirsá, which was plundered and burnt. Bhatner had shared the same fate before, and Fathábád and Ahroní followed. 'Not a house was left standing'; the inhabitants were killed and the fugitives were pursued by cavalry. The district seems never to have revived from the ravages committed by Timur's soldiers.

In 811 H. (1408 A. D.), Sultán Muhammad wrested Hisár Fîrúzah from Qiwám Khán, to whom Khizr Khán, in 809, had given it. In 832 (1428-29 A. D.), Malik ush-sharq Mahmúd Hasan commanded the district; and in 838 (1434-35), Hisár was given to Iqbál Khán.

In 925 H. (1519 A. D.), it was taken by Bábar's troops from Hamíd Khán. The town and the district were shortly after set aside for the household of Prince Humáyún.

According to some authorities, Sher Sháh was born at Hisár (others, perhaps more correctly, say at Nárnaul), where his grandfather Ibráhím Khán Súr had taken service with Jamál Khán Sárangkhání.

On Humáyún's return from Persia, Hisár Firúzah became the appanage of Prince Akbar. Akbar afterwards gave it for the same purpose to Prince Salím; Jahángír gave it to Prince Khurram; and Sháhjahán, in 1043 (1633 A. D.) gave it to Dará Shikoh.

During the reign of Akbar, Hisár Firúzah is mentioned as a mint-place for silver and copper coins. The district supplied the *ghí* for the imperial household, and was often visited as a favorite hunting-ground.

The *Tuzuk-i-Jahángírí*, *Pádsháhnámah*, and *Tuzkirah-i-Salástin-i-Chaghtáiyah*, mention the following Faujdárs of Hisár Firúzah—

In 1016 H. (1607 A. D.), Mubárák Khán Sarwání.

1018 H. (end of 1609), Saif Khán Bárha.

1023 H. (1614), Hashim Khán.

1025 H. (1616), Muhammad Husain, brother of Khwájah Jahán.

1042 H. (1632), Kripá Rám Gaur.

1043 H. (1633), Muhammad 'Alí Beg.

1129 H. (1717), Salábat Khán Bárha.

Disturbances seem to have been frequent in the district. In 1614 A. D., we hear of disturbances caused by Dalpat Singh (*A'in Translation*, I, p. 359); in the last year of Sháhjahán's reign, Lashkar Khán had to quell disturbances in Hisár and Bíkánír; and in 1131 H. (A. D. 1718), Najm-uddín 'Alí Khán was sent to Hisár by the emperor Farrukh-Siyar to keep rebels in check.

Of Hisár celebrities, I find the following—

1. Shaikh Junaid, a saintly descendant of the great Shaikh Faríd-ud-dín Shakkar-ganj of Dípálpúr (the old Ajodhan). Junaid, according to the *Khasinat-ul-Agflá* (p. 398), lived and died at Hisár, where his tomb is still shewn. He wrought many miracles, and was also known for the extraordinary rapidity with which he could write. He died in 900 H. (1494 A.D.). *Vide* below Inscriptions III and IV.

2. A poet who received from Akbar the *nom-de-plume* of Mihnati, 'the drudge'. He was Qází of Sarhind, where he died. *Badda'at* (III, 337) gives a few of his verses.

3. Dádú Khán, the conqueror of Palámanu and founder of the town of Dádúnagar in Southern Bihár, where his descendants still live. He died in 1084 H. (1673 A. D.). A biographical notice by me will be found in the *Indian Antiquary*, Vol. I, p. 77.

Regarding the various Jat tribes in Hisár Firúzah, *vide* Elliot's *Races of the N. W. Provinces*, by Beames, Vol. I, p. 130; and regarding the western boundary of the district, and its parganahs, Vol. II, pp. 17, 18, 133.

Mr. Delmerick's Hisár inscriptions amount to twelve; of No. I he sent a reading. Among the inscriptions the reign of Humáyún is well represented. I now give my readings and translations.

I.

From a mosque near the Taláki (طلاقي) gate, Hisár, west (metre, long *ramal*).

يا حافظ بسم الله الرحمن الرحيم يا حفيظ
مسجد جامع مرتب شد بعون ذوالجلال * همچو كعبه در كمال و همچو قبله در جمال
نزد او جاء معظم همچو زمزم چشمه دار * آب او همچو دم عيسى است در نبع پلال
ابن دو جاشد ز امر بي فاطمه خاتون كه آوست * صادر خان معظم قطب خان با كمال
در زمان دولت بهلول شاه دين پناه * آنكه مثل او نباشد هيچ شاهي در قبال
دويمى روز از جمادى الاولين تاريخ بود * و از كه هجرت گذشته هشتصد و هفتاد سال
سنه ۸۷۰

In the name of God, the merciful, the clement !

O Preserver ! O Guardian !

1. The Jámí' Mosque was erected with the help of the Lord of glory ; (it is) like the Ka'bah in perfection, like the *Kiblah** in beauty.

2. Near it is a large well with a spring like the Zamzam ; its water, like the breath of Christ, removes sickness.

3. Both were built by order of the lady Fátimah Khátún, who is the mother of the mother of the great Khán, the distinguished Kutb Khán,

4. In the time of the reign of Buhlúl Sháh, the protector of the faith, of him like whom no other king is in battle.

5. The date is the 2nd day of Jumáda I, and 870 years had elapsed since the time of the Flight. [21st December, 1465.]

II.

From the Mausoleum outside the Nágóri Gate, South. The rubbing measures 8 ft. 2 in. by 5 in.

بسم الله الرحمن الرحيم
لا اله الا الله محمد رسول الله صلى الله عليه
نقل ابن سلطان المشايخ والاوليا شيخ محمد بن شيخ محمود چشتي في التامع
من شعبان سنة اثني وتسعين وثمانماية ١١

In the name of God the merciful, the clement !

There is no God but Allah, Muhammad is Allah's prophet, may God bless him !

The departure of this king of the Shaikhs and the Saints, Shaikh Muhammad, son of Mahmúd, the Chiahtí, took place on the 9th Sha'bán, 892 [21st July, 1487].

* As *Kiblah* is here opposed to the Ka'bah, it seems to refer to Jerusalem (*Sakh-sat*).

III and IV.

These two inscriptions come from the same Mausoleum as Inscription II. They measure 6 ft. 10 in. by 9 in., and 6 ft. 2 in. by 5 in., respectively. It looks as if the builder Junaid was the same as Shaikh Junaid, mentioned by me above among the 'Hisár Celebrities'. The date of his death, as given in the *Khazînah* would be too early; but the fact that he is called 'Ajo-dhani' seems to prove the identity.

The spelling 'Achodhani' for 'Ajodhani' is quite clear in the rubbing.

بسم الله الرحمن الرحيم

الخزعة من ربيع الاول سنة سبع وعشرين وتسماية بانيه جنيد بن چندن ॥

On the 1st Rabi-ul-awwal, 927. The builder is Junaid, the son of Chandan. [9th February, 1521].

الخزعة من شهر ذى القعدة سنة احدى وثلاثين وتسماية بانيه جنيد بن چندن
بن محمود اجدهني ॥

On the 1st Zî Ka'dah, 931. The builder is Junaid, son of Chandan, son of Mahmûd, of Achodhan. [20th August, 1525.]

V.

From a mosque outside the Dihlî Gate, situate in the Sarâi Nathrûâ Bhatyârâ (a baker). Four lines, 2 ft. 5 in. by 1 ft. 3 in.

بسم الله الرحمن الرحيم

قال النبي عليه السلام من بني مسجد لله بني الله تعالى له بيتا في الجنة بعد
توفيق الله الملك العلام وبركت حضرت رسالت عم در عهد ميمون ودولت ايام
افزون خدايگان ناصر جهان عادل الزمان سلطان الهند و الخراسان رافع رايات
المجاهدات والمغازي محمد همايون پادشاه غازي خلد الله ملكه وخلافته و ابد
على العالمين عدله ورافته بنا كرد و مزين گردانيد ابن مسجد مرغوب بهمارت خوب
بمرفعات حضرت معبود بنده ابيدوار رحمت پروردگار المستعين بالله ولرحمان
الحليني نظر قلبي ابن شاه قلى خان المعروف نظام الدين خان تركمان زاد الله تعالى
ماعطاه و بلغه الى ما يتمناه بحرمه [سيد] الابرار والاخبار مؤرخا في الرابع من شهر
شعبان ختمه الله بالظفر والامان سنة ٩٣٩ كاتب حروف عبد الله يوسف احمد
بن ركن الدين ॥

In the name of God, the merciful, the clement !

The prophet (upon whom be peace !) says, 'He who builds a mosque for God, will have a house built for him by God Almighty in Paradise. After the grace of God, the King, the omniscient, and the blessing of the Lord of prophethip (on whom be peace !), in the auspicious time, and the day-increasing reign of the sovereign, the helper of the world, the just one of the age, the king of India and Khurâsân, who raises the standard of holy strife and war, Muhammad Humâ'ûn, Padshâh-i-Ghâf, —may God perpetuate his reign and spiritual rule and extend over all ages his justice and his compassion !—this fine mosque was built and adorned, in beautiful struc-

ture, in order to please the Lord who is adored, by the slave who hopes in the mercy of the All-nourisher, who seeks help from God and takes refuge with the Merciful, Nasar Kuli, son of Sháh Kuli Khan, who is known as Nizám-uddín Khán, the Turk-mán,—may God increase what He has given him and bring him to what he desires, for the honor of the chief* of the pious and the saints! Dated 4th Sha'bán (may God allow the month to end in victory and security'), 930. [1st March, 1533.]

The writer of these letters is 'Abdullah Yúsuf Ahmad, son of Rukn-uddín.

VI.

From the Jámi' mosque of Hisár. The inscription consists of nine lines, and measures 1 ft. 11 in. by 1 ft. 5 in.

بسم الله الرحمن الرحيم

وان المساجد لله فلا تدعوا مع الله احدا وانه لما قام عبد الله بدعوة كادوا يكونون عليه لبدا * قال عليه السلام من بني لله مسجدا يابغى به وجه الله بني الله له في الجنة مثله * تمام شد ابن مسجد درابام دولت شهنشاه الاعظم والحقان المعظم مالك رقاب طوايف الاسم من الهند والترك والعرب والعجم السلطان الفاضل الكامل الولي الوالي والحقان العادل العلي العالى الذى وجب اعاقته كاظمة الله ورسوله بحكم اطيعوا الله واطيعوا الرسول واولى الامر منكم حافظ بلاد الله ناصر عباد الله رافع رايات المجاهدات والمغازي محمد همايون بادشاه غازي خلد الله تعالى ملكه وفي بحار اللطف اجرى فلكه سعي جناب مساعدت فرجام زبدة فضلاء الانام نتيجة امراء المعظام امير محمد بن عليحجاب امارتآب مملكت پناه نظام الدين بيك مهرک بن جناب المغفور المبرور خوشکيلدى * * * بن جناب مغفرت مآب * * * * * فردوس مکاني *

شد بنای مسجد بهر خدا ادر حصار * کورفیع القدر آمد همچو کیوان سربلند بس که عالی قدر وکیوان هیئت و موزون فناء * هر که دید افناء او را طرح این مسجد پسند چون پسند آمد تمام اهل دل تاریخ او * باب * * * * * رحمت گفته اند

سنه ۹۴۲

کاتبه و قائله نظام * *

In the name of God, the merciful, the clement!

'The mosques belong to God. Do not associate any one with God. When the servant of God rose up to pray to Him, it nearly happened that they [the *finns*] pressed on him in crowds' [Korán, lxxii, 18, 19.]. The Prophet says 'He who builds a mosque for God desiring thereby God's honour, will have one like it built for him by God in paradise.' This mosque was finished during the time of the reign of the great king of kings, the exalted prince, the master of the necks of crowds of nations among the Indians, Turks, Arabs, and Persians, the accomplished Sultán, the perfect, the chief, the ruler, the just prince, the high, the exalted, whom to obey is as necessary as to obey God and the Prophet, according to the Korán verse 'Obey God and obey the Prophet

* *Sayyid*. The word is left out in the inscription; but the phrase is common, and the conjecture is easy.

and those who have authority among you,' the guardian of God's countries, the helper of God's servants, who raises the standard of holy strife and war, Muḥammad Humá'yún, Bádasháh-i-ghásí—may God Almighty perpetuate his kingdom and guide his ship in the seas of His favor!—through the exertion of the auspicious dignitary, the cream of the accomplished among men, the issue of great Amír, Amír Muḥammad, son of the distinguished noble, the meritorious Nizám-uddín Beg Mírák, son of the pardoned and purified Khushkíldí * * * son of * * * of Bábar.

1. A mosque has been built in Hisár for the sake of God, which is as high in dignity as the seventh heaven.

2. Because it is high in dignity, and has the aspect of the seventh heaven, and has turned out well adjusted, every one who saw it has approved of the style of this mosque.

3. Because all people of sense approved of it, its chronogram is * * * * (illegible). A. H. 942 [A. D. 1535-36]

The writer and composer is Nizám * * *

VII.

From a Maḡbarah outside Hisár, about a mile eastward, near the house of Col. Foster, Dy. Commissioner, Hisár. 1 ft. 1 in. by 1 ft. 2 in.

بسم الله الرحمن الرحيم

در عهد میمون و دولت محمد همایون خلد ملکه و سلطان و اعلی امر و شانہ
ابن عمارت * * * والنو خان * * * بن میر * * * بن سلطان ملک بک در غره ماو
رمضان سنہ ثلاث و اربعین و تسعمایہ * * * شد ||

In the auspicious time and reign of Muḥammad Humá'yún—may God perpetuate his kingdom and his rule and elevate his condition and dignity!—this building was * * by Wáltú Khán * * son of Mír * * son of Sulṭán Malik Beg, on the 1st Ramazán 942.

Along the right hand side of the inscription the following words are found—

این * * * گنبد * * * بست هزار تنگہ * * * باهتمام شیخ منور بن قاسم انجام شد ||

This * * vault * * * 20,000 *tángahs* * * * was completed under the superintendence of Shaikh Munawwar, son of Qásim.

It is possible that the Wáltú Khán of this inscription is the Báltú Khán mentioned in my *Áin Translation*, Vol. I, p. 475, No. 207.

VIII and IX.

Both inscriptions come from the same Maḡbarah as No. VII. They measure 2 ft. 8 in. by 1 ft. 9 in. and 2 ft. 6 in. by 1 ft. 5 in., respectively.

بسم الله الرحمن الرحيم

در عهد میمون و دولت همایون سلطان الهند و الخراسان رافع ریای المجاهدین
و المغازی محمد همایون بادشاه غازی خلد خلافتہ ابن عمارت بقاریخ ماو رجب
رجب قمر سنہ لوج و اربعین و تسعمایہ تمام شد و این گنبد بر تودی کوچک

بن میر برنطق مغل شده است و این جوان در لشکر گجرات شهادت یافت و مبلغ
پانزده هزار تنگه سپاه خرج شده است ||

In the name of God, &c. In the auspicious time and the august reign of the king of India and Khurásán, who raises the standard of holy strife and war, Muhammad Humáyún, Bádehsh-i-ghásí—may God perpetuate his rule!—this edifice was completed during Rajab (may the dignity of the month increase!) 944. [January, 1538.] And the vault was made for the sake of Turdí Beg Kújak, son of Mír Barantag the Mughul; and this youth was killed in the Gujrát war. The cost was 15,000 black *tangahs*.

بسم الله الرحمن الرحيم

در عهد محمود و دولت همایون سلطان الهند و الخراسان رافع ربابت اچا هدايت
و المغازي لجهاد الدين محمد همایون بادشاه غازي خلد خلافته بتاريخ ماه رمضان
سنه اربع و اربعين و [تسمایه] این عمارت از * * میر عاشق محمد بن میر شاه
علی شد و این جوان در لشکر گجرات شهادت یافت و مبلغ دوازده هزار تنگه
سپاه خرج شده ||

In the name of God, &c. In the auspicious time and august reign &c., [as above]—this edifice was completed during Ramazán, 944. [March 1538]. And this edifice was made on account of * * Mír 'Kshiq Muhammad, son of Mír Sháh 'Alí; and this youth was killed during the Gujrát war. The cost was 12,000 black *tangahs*.

X.

From a dome outside Hisár, about a mile to the east, inside the Commissariat godowns. 1 ft. 5 in. by 1 ft. 10 in. The poetry is execrable (metre, *Mutaqárib*).

گل و خشت او مشک و عنبر سرشت	خوشا گنبد روضه چون بهشت
روان سلسبیل ز اشجار و کشت	ز انقباس باغش معطر دماغ
که تاریخ بر گنبد آمد نوشت	دیو فلک گشته برگرد او
سنه ۹۷۵	
که حکمش به بنیاد بنهاد خشت	هزار آفرین بر ابای بزید
کاتب کبیر	

1. How beautiful is the dome of the paradise-like mausoleum; its mortar and bricks are like musk and ambergris.
2. From the scent of the garden the brain is perfumed; and a Salsabíl (a spring in paradise) flows from its trees and meadow.
3. The secretary of heaven [Mercury] turned round it, when the date was written on the dome: A. H. 976 [A. D. 1567-68].
4. Much praise is due to Bâ Yasíd, by whose order the bricks were placed on the foundation. Written by Kabír.

XI.

From a mosque in the yard of 'Sher' Buhlál's mausoleum, outside Hisár, one mile to the south. The rubbing is 2 ft. 5 in. square, and the characters are in well-formed *Nasta'liq* (metre, long *ramal*).

پیروے شرع رسول مجتبیٰ عبد الذبی
آنکہ دبدارش دھند آئینہ دل را جلا
پیش معین روضہ بہلول شاہ افکند طرح
مسجدے عالی کہ باشد مسکن اہل دعا
بہ تکلف ہائے زد بانگ کاین مصرع ز پس
در ہزارو یکصد و شش یافت اتمام این بنا

1. The follower of the law of the Prophet, the chosen one, 'Abd-un-nabí, whose sight gives brightness to the mirror of the heart,

2. Erected before the courtyard of Sháh Buhlál's mausoleum a grand mosque, which is to be the dwelling of worshippers.

3. A voice from heaven announced without difficulty the final hemistich, 'This building was completed in 1106. [A. D. 1694-95.]

XII.

From the Dargáh outside the Taláki gate. 1 ft. 2 in. by 6½ in. (metre, *Khafif*.)

بسم الله الرحمن الرحيم
شاہ ایوان فقر اسمعیل یافت از حق برات بر فردوس
سال می جستیم از خرد ناگاہ گفت ہائے برقت در فردوس
نام حکاک پیر بخش ساکن بیگانہ فرمود مولوی امام بخش صاحب مہدائی
تخلصی دہلوی سنہ ۱۲۳۶

1. The king of the palace of poverty, Ismá'íl, received from God an order on paradise.

2. I was searching for a chronogram, when a voice from my heart suddenly said, 'He went to paradise.' [A. H. 1236; A. D. 1820-21.]

The name of the engraver is Pír Bakhsh, an inhabitant of Bíkánír. By order of Maulawí Imám Bakhsh Sháhí, whose *nom-de-plume* is Sháháí, of Dihilí.

Regarding Imám Bakhsh Sháháí, *vide* Garcin de Tassy, *Histoire de la Littérature Hindoue et Hindoustanie*, Vol. III, pp. 22 to 26.

For other inscriptions belonging to the neighbourhood of Hisár, *vide* my readings and translations of Mr. Delmerick's Abúhar and Sirsá Inscriptions, in *Proceedings*, As. Socy. Bengal, for March, 1874, p. 72 (where on l. 22 'uncle' must be corrected to 'father').

District A'samgarh.

I.

From a Mosque in the village of Ganjahra, Parganah Muhammaddábád.

در زمان شاہ عالم گیر دین پرور کزو رونق دین مسجد است افزون از قبای
شد بنا از فیض خورشید کرم للمنفین مسجدے کز نور آن انجم نماید اقتباسی

حامدان عرش گفتند از کمال چیست این گفتند از این الکمال است این کمال حق شنائی
 رفعت شانش به بیت الله میماند به فضل ذرؤ اوجش باوج آسمان کردو مساس
 سال تاریخش چو پیرسدم ز پیر عقل گفت از مسجد صالح است این مسجد احسن اساس
 سنه ۱۰۹۹

1. In the time of the Emperor 'A'lamgir, who fosters the faith, and through whose splendour the religion of Muhammad has increased beyond expectation,

2. This mosque was built for the pious through the kindness of the sun of generosity—a mosque from the radiance of which the stars borrow (their light).

3. The carriers of God's throne asked, 'What perfect man has done this'; and I said, 'This perfection of piety comes from the scion of perfection.'

4. Its exalted shape resembles the House of God [the *Ku'bah*] in excellence; the top of its summit touches the summit of the heaven.

5. When I asked for a chronogram, Genius [*pr.* the old man of thought] said, 'This mosque of excellent foundation was built by Muhammad Sâlih,' A. H. 1099. [A. D. 1687-88.]

I do not know whether the builder is the same as the Muhammad Sâlih who is mentioned several times in the '*A'lamgir-namah*' and the *Madâsir-i-'A'lam-giri*.

II.

From an old mosque at the ruined village of 'Kashbah,' properly Kashbah Nigún, Parganah Mâhul.

بعد محمد هابون الفقير محمد عطا بن دوست قلی کابلی سنه اربعین
 و تسعماية ۱۱

In the reign of Muhammad Humáyún.....the poor Muhammad 'Atâ, son of Dost Qulî, the Kâbulî. A. H. 940 [A. D. 1533-34].

Sher Shâh spent some part of his early life in Nigún.

III.

On a broken slab found in the village of Chakesar, Parganah Ghosî.

Chakesar was formerly the name of a parganah. It is now a tappâ, and is included in Parganah Ghosî.

بنا شد مسجد جامع بفيض فضل رباني *
 بعد شاه فیروز آن شاه عالم ۷ بر شاهان *
 مگراب و مسجد *
 بنا ربيع نبي بودست هفصه هشت *

1. The Jâmi' mosque was built with God's blessing.....

2. In the reign of King Fîrûs, that king of the world who over all kings....

3. ——— niche and mosque....

4. According to the era of the Prophet it was in 78, that.....

The left half of the slab is broken off. The characters of the inscription are the same as on the Irish inscription of A. H. 815, published by me in *Proceedings*, A. S. Bengal, for March 1874, pp. 69, 70. On both inscriptions the word *as kih* is spelt *ℓ ka*, though the metre shews that *ℓ* is short.

IV.

From a stone at the Dargáh of Pir Káshánt in Muhammadábád Kháq, Parganah Muhammadábád.

The rubbing is illegible, and the name of this saint from the town of Káshún (in Persia) is not known to me.

The following papers were read—

1. *Note on the old Manipuri Character.*—By G. H. DAMANT, C. S., *Officiating Political Agent, Manipur.*

(Abstract.)

The Manipuri alphabet appears to be a form of the Devanágari, and was, in all probability, introduced from Bengal along with Hinduism by some wandering *sanyásí* in the reign of Charairongba (1700 A. D.). The alphabet is ill-adapted to the wants of the language, but is used by the 'maibees,' or priests, who keep up a national chronicle, in which every event of importance is recorded.

The number of Manipuri MSS. is exceedingly limited. Mr. Damant mentions five, and gives a facsimile, transliteration, and translation, of the first page of the 'Samsokgnamba.' *Vide Journal and Proceedings for 1875.*

The paper will appear in No. 1, of Pt. I, for 1877.

MAJOR GODWIN-AUSTEN said—There is but little doubt that the Manipuris are a mixed race drawn from the Hill-tribes that encircle the valley, particularly the Nága. Even now a certain intermixture of blood goes on through the connections formed by Manipuris with Hill women that come down into or live in villages contiguous to the valley, or take service in Manipuri households. He believed also that men of the Hill-tribes are admitted into the Hindu community.

2. *Descriptions of three new species of Birds belonging to the genera Pomatorhinus, Actinura, and Pellorneum, from Saddy, Assam.*—By Major H. H. GODWIN-AUSTEN.

(Abstract.)

This paper contains the descriptions of three interesting new forms recently collected by Mr. M. T. Ogle in the neighbourhood of Saddy,

Assam, viz., *Pomatorhinus stenorhynchus*, *Actinura Oglei*, and *Pellorneum pectoralis*.

The characters of some of the other specimens were briefly noticed, and the close relationship of *Actinura Oglei* with *Turdinus guttatus*, Tickell, from Tenasserim, pointed out. The other forms, probably new (further examination being necessary), were provisionally noted as *Ohleusicus atroperciliaris*, *Abornis flavogularis*, and *Turdinus Williamsoni*.

3. *Description of two new Species of Freshwater Crustacea obtained by Mr. O. Limborg in the Houn-g-da-rau Valley, Tenasserim.*—By J. WOOD-MASON.

(Abstract.)

The author exhibited and read descriptions (i) of *Paratelphusa Limborgi*, which is said to differ from its near ally *P. Edwardsii* (from the streams of the flat country lying along the base of the hill-ranges of the N. E. Frontier of India) in the great development and prominence of the extraorbital angles and of the front, which latter is also broadly emarginate, in its slenderer legs, in the ungrooved condition of the 2nd joint of its external maxillipeds, &c., and (ii) of *Telphusa lobifrons*, in which the front is divided by a broad and deep indentation of its surface and by an emargination of its free edge into two lobes, themselves slightly emarginate, in which the external margin of the extraorbital tooth is equal in length to half the width of the front, in which the posterior margin of the carapace and the front are of equal width, &c.

The collection sent up by Mr. Limborg also contains numerous examples of *Telphusa Larnaudii*, A. M.-Edw., but none of *Paratelphusa Sinensis*—a form that abounds in the neighbourhood of Moulmein.

4. *Note on a case of Death by Lightning in a Mine, communicated by I. J. WHITTY, Esq., Supdt. of the Kurhurbari Collieries, Giridhi.*

A remarkable case of death by lightning in a mine has been communicated by I. J. Whitty, Esq., Supdt. of the Kurhurbari Collieries. The mine is a shallow one, worked by levels driven on the side of a flat-topped hill, only 20 feet from the surface, which is therefore the thickness of rock above the coal seam. The working-face, where the accident occurred, is about 180 feet from the opening. There were a number of miners in the drift at the time. Those near the entrance were unaffected. The two who were killed (a man and a woman) were at the working-face in adjoining galleries, separated by about 12 feet of coal. Two other miners nearest to the face were knocked down and severely stunned. They were all natives; and the only account that they could give of what occurred was, that sparks

seemed to come out of the pillar of coal between the two who were killed. They say they were not aware there was a thunderstorm going on.

Mr. Whitty states that no mark of any kind could be observed on the bodies, nor anywhere in the mine or on the tools lying about; but that a young *edl* tree standing as nearly as possible over the position of the accident was slightly damaged, and that in the ground at its base a hole, about one inch in diameter, seemed to have been formed by the lightning.

The little hill, or plateau, in which the mine is situated is one of a small irregular group in the centre of the coal-field, about 200 feet high. It is formed of the coal-measure sandstone. The drainage is thorough, and the mine was quite dry. From the presence of the workmen, the sides of the gallery and the air in it were probably damper than the rock. The tree, or other vegetation on the hill is scanty.

The accident occurred at about 1.30 P. M. on the 31st January. There had been no rain from 15th October to 12th January, when one inch of rain fell. There were some intermediate showers, and 0.96 fell on the 31st, the total for the month being 2.42 inches.

Mr. H. F. BLANFORD said that a lesson of great practical importance might be learned from the very remarkable case communicated by Mr. Whitty, *viz.*, the very low conductivity of rock *in situ*, unless saturated with water. Notwithstanding the enormous sectional area of the rock-conductor presented by the mass of the hill, so low was its conductivity that the discharge took place through the bodies of these unfortunate workmen, in sufficient quantity to kill two of them and injure others. Now, looking at the manner in which the great majority of the lightning rods attached to houses in Calcutta terminate below, we can fully understand that they must be useless or even worse than useless. There is one on a house occupied by the Bengal Club, which terminates on the top of a post, and at the very best, they generally leave about a foot of the lower end buried in ground which is kept pretty dry by the drainage into the Calcutta sewers. Such rods can offer no protection, and, as if to ensure their inutility, they never range to a sufficient height to command more than a protected radius of 3 or 4 feet. It is little wonder that we constantly read of houses which are provided with lightning rods being struck by lightning, the rod taking no part in the discharge.

The CHAIRMAN remarked that it not unfrequently happened that persons who had been killed by lightning manifested no outward sign of injury. Such was the case in an instance that occurred on the Calcutta maidan a short time since, where death had been instantaneous. Had it not been for the circumstance that the man happened not to be alone and that his companion though thrown down escaped with only temporary nervous derangement, the cause of his death must have remained a matter of

conjecture merely, as although the body was examined a few minutes after the occurrence, nothing could be detected indicative of the cause of death. Unfortunately our knowledge of the minute texture of the organs and tissues of the body is not sufficiently advanced to enable a definite opinion to be given regarding the precise cause of death in cases of this kind when unaided by circumstantial evidence.

In this case also there were no marks on the roadway suggestive of anything unusual having occurred, or to indicate the spot where the discharge had struck the ground.

LIBRARY.

The following additions have been made to the Library since the Meeting held in March last.

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No. 3. *Prof. W. Harkness*.—Theory of the Horizontal Photoheliograph, including its application to the determination of the Solar Parallax by means of Transits of *Venus*. *M. Erck*.—An improved mode of viewing the Sun.

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Heft II. *Puschl*.—Ueber den Einfluss von Druck und Zug auf die thermischen Ausdehnungscoefficienten der Körper und über das bürgerliche Verhalten von Wasser und Kautschuk.

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THE EDITOR.

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COMMANDER A. DUNDAS TAYLOR.

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IMPERIAL ACADEMY OF SCIENCES, VIENNA.

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22. 1st. Rig Veda III, 53, 19 *spandané* oder *syandane*, Rig Veda IV, 3, 10, *áspandamáno* oder *asyandamáno* zu lesen, von T. Benfey.

23. Wie kam der Verfasser die, sten *Vártika* zu Pánini VII, 3, 87 dazu, eine Wurzel spät mit langem *á* anzunehmen.

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- No. 9. *M. J. Guérin*.—Expériences sur l'origine et la nature de la fièvre typhoïde. *M. F. de Romilly*.—Sur les effets du jet d'air dans l'eau et sur la suspension de l'eau dans l'air. *M. L. Smith*.—Sur trois chutes récentes de pierres météoriques dans l'Indiana, le Missouri, et le Kentucky. *M. M. V. Feltz et E. Ritter*.—Expériences sur l'empoisonnement aigu par le sulfate de cuivre.
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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR MAY, 1877.

The Monthly General Meeting of the Asiatic Society was held on Wednesday, the 2nd inst., at 9 o'clock P. M.

W. T. BLANFORD, Esq., Vice-President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The following presentations were announced—

1. From the editor, C Morehead, "Memorials of the Life and Writings of the Rev. R. Morehead, D. D."

2. From the author, "The Materia Medica of the Hindus," compiled from Sanskrit Medical Works, by Uday Chand Dutt.

3. From the author, "Serpent and Siva Worship and Mythology in Central America, Africa, and Asia," by Hyde Clarke.

4. From the authoress, "The Mountain Karen Colony in Toungoo, Burma," by Mrs. E. Mason.

5. From Bábu Haris Chandra of Banáras, through Dr. Rájendralála Mitra, a Tibetan drawing of Buddha and his disciples.

The following gentlemen, duly proposed and seconded at the last Meeting, were elected Ordinary Members—

Mr. J. A. Bourdillon.

Mr. W. Sandford.

The Hon'ble T. E. Ravenshaw, C. S.

The following are candidates for ballot at the next Meeting—

1. H. K. W. Arnold, Esq., proposed by Major H. H. Godwin-Austen, seconded by J. Talboys Wheeler, Esq.

2. The Mahárájá of Darbhangá, proposed by H. B. Medlicott, Esq., seconded by Capt. J. Waterhouse.

A. W. Croft, Esq., for re-election, proposed by H. F. Blanford, Esq., seconded by W. T. Blanford, Esq.

The CHAIRMAN announced that, in accordance with the notice given at the March Meeting, the votes would be taken whether the following rider to Rule 64 should be added to the Rules of the Society.

Before circulating any question coming under clause (c) of Rule 64 for the votes of the general body of members of the Society, the Council shall cause to be sent to every resident member, at least 48 hours before the General Meeting at which such question is to be proposed, a printed circular in which shall be set forth the nature of the proposal and the reasons for it, in order that it may be duly discussed at such General Meeting. A statement of any objections that may be raised at the Meeting against the proposal shall also be circulated with the voting papers.

Mr. Waldie and Major Godwin-Austen were appointed Scrutineers and reported that there were 62 votes for the addition and 2 against it. The CHAIRMAN thereupon announced that the proposed Rule had been carried.

The CHAIRMAN announced that Col. J. F. Tennant had been appointed a Member of Council in the place of Dr. D. B. Smith.

The SECRETARY read extracts from a letter from Dr. Dobson stating that Mr. Geflowski was about to commence work upon the bust of Dr. Oldham, and that the marble bust of Dr. Stoliczka by the same sculptor was also in progress and nearly finished.

Mr. W. T. BLANFORD called attention to some recent researches by Prof. Jeitteles, of Vienna, on the origin of the domestic dog, researches which have a peculiar interest in India, because in Professor Jeitteles' opinion two common Indian animals are amongst the most important wild species from which the various forms of domestic dog are descended. Other authors have already concluded that several wild forms of wolves and jackals have been tamed by man in various parts of the world and that different races of dogs have thus originated, many of the races having of course undergone great modification through the process of artificial selection by man and from other causes. Most of the details known before 1868 were given by Darwin in his work on 'Domesticated Plants and Animals' and the conclusions at which he arrived, that domestic dogs are derived from several different wild species, appear to be confirmed by Prof. Jeitteles, although the researches of the latter have shewn that some forms formerly supposed to have contributed to the ancestry of domestic dogs must be omitted from amongst the races from which various kinds of dogs are derived and others previously unsuspected must be included.

Professor Jeitteles' first contribution to this very interesting question appears to have been the examination and comparison of dogs' skulls found with human remains of the stone age. An animal had already been de-

scribed by Rütimeyer from the pile buildings (*Pfahlbauten*) or lake dwellings of Switzerland as the peat dog (*Torf-hund*) *Canis familiaris palustris* and considered a form intermediate between wolves and jackals. Professor Jeitteles considers that the skull of this dog is absolutely identical with that of the jackal, *Canis aureus*. He also shews that many of the modern smaller races of dogs are in all probability descended from the same ancestor. The Asiatic jackal, as is well known, becomes very rare east of the Bay of Bengal, and is unknown in Southern Burma, the Malay Peninsula, Siam or China, whilst to the westward it extends a considerable distance into Europe, being found in Turkey and Greece, and it ranges throughout northern Africa.

Professor Jeitteles remarks that in some of the smaller races of dog, especially terriers, owing to thorough domestication, and the combined effect of more highly developed intelligence and disuse of muscular power through many generations, the form of the jackal skull has been changed by the loss of the ridges to which the muscles are attached and the development of the brain cavity, so that the form recalls in a singular manner that of certain monkeys.

The next dog-skulls to which Professor Jeitteles turned his attention were those of the dogs found associated with human remains of the bronze age at Olmütz and other localities. These are much larger than the dogs' skulls of the stone age, and differ in several peculiarities, especially in being much more wolf-like. Still they shew many differences from the skulls of the European wolf; they are smaller, and there are important distinctions in the dentition. After comparing the bronze age skulls with those of several wild species of African and American *Canidæ*, they were at last found to agree with singular accuracy with the skull of the Indian wolf, *Canis pallipes*. The chief peculiarity of dentition in which the dog of the bronze age and the Indian wolf agree, whilst both differ from the common European wolf, is that in the two former the length of the carnassial tooth is less than that of the two hinder or tubercular molars in the upper jaw, whilst in the common wolf the reverse is the case.

Amongst living dogs, some shepherd's dogs appear most closely allied in the form of their skull to their probable ancestor of the bronze period. Poodles came nearest after the shepherd's dog.

Professor Jeitteles suggests that the Indian wolf is also found north of the Himalaya and Hindu Kush. In this view Mr. Blanford said he could not quite agree. The wolf of Central Asia is certainly a much larger form, the skins obtained by Dr. Stoliczka in Eastern Turkistan appeared to belong to the European wolf or a closely allied species, but unfortunately no skulls were brought. Dr. Severtzov also refers the wolf of western Turkistan to *Canis lupus*. The Persian wolf however is unknown;

but it is more probably allied to the European than 'to the Indian species, because the other mammals of the Persian highlands are Pala-arctic forms. Even the wolf of the Baluchistan highlands is, there is every reason to believe, a larger animal than *Canis pallipes*. There is a smaller wild Canine in Persia known as *Sag-gürg* (dog wolf) which, however to judge by a flat skin, the only portion examined, is not the Indian wolf. A small slender form of wolf is stated by Professor Jeitteles on the authority of Professor Bagdanow of St. Petersburg to exist in the steppes between the Aral and Caspian.

One Asiatic wolf, however, that of the Tibetan highlands, *Canis laniger*, Hodgson, does appear to approach the Indian wolf to some extent. It appears to be somewhat larger, though inferior in size to the European wolf. The Indian Museum contains a fine series of skulls of the Tibetan wolf derived from the Society's old collection, and although these considerably exceed the skulls of *C. pallipes* in size, they shew the same peculiarity of the molar teeth, the "carnassial" being a little shorter than the two tubercular molars taken together. In five skulls of the Tibetan wolf the length of the former varies from 19 to 22 millimètres measured along its outside margin, that of the two latter together similarly measured from 21 to 28.5 mill. The length of the skulls from the anterior lower edge of the *foramen magnum* to the alveolar margin of the incisors measures in these five skulls (or rather in four, one being imperfect behind,) from 190 to 210 millimètres (7.46 to 8.25 inches).

Professor Jeitteles proceeds to trace the probable descent of the half-wild common street-dog of Egypt and the Levant from one of the African jackal-like animals *Canis lupaster*, Hemph. and Ehr. and of an African race of greyhounds from one of the forms of *C. anthus*, Cuv. With these we have no particular concern, but it is otherwise as regards the pariah dog of India. Professor Jeitteles is inclined to believe from the accounts given by various naturalists and travellers that there are two races of pariah; a larger, probably derived from *Canis pallipes*, and a smaller from *C. aureus*. Despite Jerdon's mention of the jackal-like dogs seen occasionally about Indian villages, it may be doubted whether any race of Indian pariah closely resembles the jackal, all appear to be much larger, and have rather the build of a wolf than a jackal. Mr. Blanford added that he was also unable to recognise two distinct races of pariah dogs, a small one and a large one; numerous variations in size occur of course, but he could not say that he had ever seen two well marked kinds. Larger dogs are kept by particular classes of natives for hunting purposes, and the common dogs appear always to run larger in those parts of India in which they are useful and can protect the flocks against the smaller carnivora, such as wolves and jackals, whilst they are small and starved from ill feeding in other parts of

the country where no care is taken of them. The subject, however, requires very much more attention than has been paid to it. One point to be remembered is that in many parts of India, around large European stations, there has been so great an admixture of the blood of European races, that a pure-bred pariah is a rarity.

It has long been known that we are probably indebted to the early inhabitants of India for two domestic animals, the buffalo and the peacock; the origin of the humped cattle is obscure, and the common fowl appears to be descendant of the Burmese and not of the Indian race. If Professor Jeitteles be correct in his views it appears highly probable that India will also claim the ancestry of some of our most valuable races of dogs. The chief reason for calling the attention of the Society to the subject is in order to suggest a further study of the pariah dogs of India. A good collection of skulls may aid considerably in working out the question of the dog's ancestry, and much light may be thrown upon the subject of the derivation of the races of men who inhabited Europe in the bronze age by determining the source whence they procured their domestic animals.

Mr. Blochmann exhibited some Arabic and Persian Inscriptions from Hápsí, received from Mr. J. G. Delmerick, Dihlí.

Ha'nsí.

Abul-Fazl, in his *Á'in-i-Akbarí*, and Amín Rází, in his *Haft-Iqlím*, speak of Hápsí as a place famous in ancient times. It is first mentioned in 427 H., or A. D. 1035-36, when Mahmúd of Ghazní took the fort of Hápsí, which up to that time had been known as the 'Virgin.' A short description of the conquest is given in the *Túríkh-i-Baihaqí*; vide Dowson, Elliot's History of India, II, 140.

From a Prithwí Rájá inscription of Samvat 1224, or A. D. 1167, published in the *As. Researches*, Vol. XV, and in the *Transactions of the R. As. Socy.* (Vol. I, pp. 183, 461), it would appear that Hápsí was also called Ksí, and that Prithwí Rájá had a palace there. Vide also Cunningham, *Arch. Reports*, Vol. V, p. 142.

Hápsí is frequently mentioned in the fights preceding the final capture of Dihlí in 599 H. (A. D. 1198). The oldest inscription found by Mr. Delmerick belongs to 593 H., or A. D. 1197; vide below Inscr. I.

In the end of the reign of Íltitmish (about A. D. 1236), Malik Saif-ud-dín is mentioned as *sábit* (سبیت), or governor, of Hápsí (*Baddóni* I, 70).

From the inscriptions given below it appears that 'Alá-uddín Khiljí, in 1303 A. D., repaired the fortifications of Hápsí.

Under Kutb-uddín Mubárak Sháh I. (1316 to 1320), we hear of a Malik Nisám-uddín Shukrí Hápsíwál. He built the Shukrí mosque at Hápsí, which was called 'Shukrí' ('thanksgiving'), because the five daily prayers

were read in it, and also prayers for the soul of the builder. *Ziyā-i-Barānī*, p. 380.

Hānsī is occasionally mentioned by the historians of the reign of Fīrūz Shāh III. (1351 to 1388, A. D.). Not long after his accession, Fīrūz Shāh, on a visit to Hānsī, was taken to task by the renowned Shaikh Ḳuṭb-uddīn of Hānsī, and was warned to give up wine drinking and hunting. Ḳuṭb's successor, Nūr-uddīn, refused the king's request to emigrate to Hisār Fīrūzah.* Fīrūz Shāh had some reason to treat the Hānsī Shaikhs with consideration. Badāonī (I, p. 242) relates that Fīrūz Shāh, when only a Malik, received from Shaikh Naḡir-uddīn, the 'lamp of Dihlī', the promise of the throne of Dihlī. When Muhammad Shāh ibn Tughluḡ, the reigning king, heard of it, he gave orders to bring Malik Fīrūz and Shaikh Naḡir as prisoners to him in Sindh. When they passed Hānsī, Shaikh Badr-uddīn (a descendant of Shaikh Jamāl) exclaimed, 'Here they take a prisoner to his throne, and he knows it not.' On reaching Tattah in Sindh, the escort reported to Muhammad Shāh the arrival of the prisoners, and they were ordered to kill them at once. But as the king during the interview was drunk and his son had gone on a hunting expedition, the escort set Malik Fīrūz at liberty, who immediately, with the consent of the nobles, raised the standard of revolt, and had Muhammad Shāh's son killed. When Fīrūz Shāh returned as king from Sindh to Dihlī, he gave Shaikh Badr-uddīn Parganaḥ Chaurāsī as a present.

Hānsī escaped the fury of Timur: the prayers of the saints protected the town, as well as Hisār Fīrūzah.

In 814 (A. D. 1411) we find that the district (*khittah*) of Hānsī was held by Maliks Idrīs and Mubārīz Khān his brother; and some time after, during the reign of Mubārak Shāh II., Hānsī was taken from Malik Rajab Nādir and was given to the Malik-ushsharḡ, the king's nephew.

Ibrāhīm Lodī (1517 to 1525, A. D.) used the fort of Hānsī as a State prison. Hamīd Khān was governor during his reign. Hamīd Khān, who is mentioned below in Inscr. VI, was defeated by Prince Humāyūn in 1526. This victory was Humāyūn's first exploit; hence Bābar gave him Hānsī and Hisār Fīrūzah as *jāgīr*.

During the reign of Akbar, who on a visit to Hānsī in 986 H. (1578 A. D.) offered up prayers at the shrine of Shaikh Jamāl, Mahall Hānsī belonged to Sirkār Hisār Fīrūzah. It contained, according to the *Āin* 886115 bighahs, and was assessed at 5434488 dāms, or 135861 Akbarshāhī Rupees, inclusive of 180056 dāms (or 3251½ Rupees) *madad-o-ma'āsh* land. Abul Fazl mentions Rājputās, Multānīs, Jātūs, and Jats, as the principal tribes of the district and believed the *mahall* capable, or liable, to raise a force of 500 horse and 7000 foot.

Elliot in his Glossary (Beames, Races of the N. W. Provinces, I, pp.

* This Nūr-uddīn of Hānsī was the preceptor of Shams-uddīn 'Alī, the historian.

83, 256), mentions the Dogars as a tribal element in Hānsī, and refers to the worship of Gogá Pīr, a local saint, who is invoked in the district between Hānsī and the Ghārā. *Vide* also Atkinson, Gazetteer, N. W. Provinces, Vol. III, p. 516.

It is curious that Hānsī is not mentioned by the historians of the reigns of Jahāngīr, Shāh Jahān, and Aurangzīb. Nor do the inscriptions given below belong to this period of Indian history.

The *Tazkirah-i-Salāṭīn-i-Chaghtāi* mentions several times one Nāhir Khān, a Shaikhzādah of Hānsī (1122 H., or A. D. 1710), who was Faujdār of Dholkḥāh in Gujarāt and Diwān of Ahmadābād. During the reign of Muḥammad Shāh, Shāhdād Khān Khweshagī was appointed Faujdār of Hānsī and Hisār, "which district from old times had been a bed of rebellion, and which, in consequence of the weakness of the government, had for some time paid nothing into the imperial treasury." Shāhdād reduced the forts of the districts, and kept the rebels down. He chiefly employed men of his own clan.

The *'Imd-ussa'adat* (Lucknow edit., p. 125) mentions that Muḥammad Bashīr Khān received from Nawāb Najaf Khān Bahādur the district of Hānsī and Hisār.

In the end of last century, Hānsī became for a short time (1798 to 1801) the capital of George Thomas, of Tipperary, whose short-lived kingdom comprised Hānsī, Hisār, Mahim, Bhadra, Sīdhmukh, Sīwānī, Behal, Jamālpūr, Toshām, Agrowāh, Barwālā, and Jīnd, which, with several places he held of the Marāṭhas, yielded a revenue of 480,000 Rupees, the former revenue derived from the same places having been Rupees 2,010,000 (*vide* Franklin, *Memoirs of George Thomas*, p. 92). When Thomas chose Hānsī as his capital, the walls of the city had fallen into decay; and 'as the town had long been deserted', he had great difficulty in procuring inhabitants. By gentle treatment he collected about six thousand people. In the end of 1801, he was attacked by the Marāṭhas under Perron and had to surrender. In the middle of January, 1802, he was escorted to the British frontier. He intended to proceed towards Calcutta, in order to retire from public life. But death overtook him, on the 22nd August, 1802, at Berhāmpūr in Bengal, where he lies buried.

Of Hānsī celebrities I have to mention the following—

1. Shaikh Ja'māl. He belongs to the great saints of India. He was a descendant of the renowned Abū Hanīfah of Kūfah. Shaikh Farīd-uddīn Ganj-i-Shakar of Ajodhan (Dīpālpūr) was his friend and lived with him for twelve years at Hānsī. From his oratorical powers, he was called 'Khaṭīb', the preacher, or Kuṭb-i-Khuṭṭāb, 'the pole star of preachers.' One of his treatises has the title of 'Muḥamāt.' He died in 659 H., or A. D. 1261, and lies buried at Hānsī.

2. **Maulānā Mughīṣ** (مغیث). He was a poet and flourished during the reign of Jalāl-uddīn Fīrūz Shāh II. (1290 to 1296, A. D.) Badāonī and the Haft Ikhlām quote a few of his verses.*

* Those who delight in the subtleties of Persian Prosody will find the verse ascribed by Badāonī to Mughīṣ (*Bad.* I, 181) of interest. Badāonī says that Mughīṣ composed a whole *ghazal* that could be read in *nineteen* different metres! It is a pity that the MSS. which the editor of the Bibl. Indica edition had for collation, give a corrupt reading of the second hemistich. The first hemistich is—

دو در گوش و قد خوش دو خد خوب و خط تر
12 11 10 9 8 7 6 5 4 3 2 1

The twelve words of this hemistich are all monosyllabic, and the 2nd, 5th, 8th, and 11th words have the *Isāfat*. But the *Isāfats* of the 5th and 11th words are not necessary, as *ast* may be supplied. Again the 2nd, 5th, 8th, 11th words may in Persian be read with or without the *Tashdīd*. Bearing this in mind, we get the following *nineteen* metres. (The numbers in brackets refer to the paragraphs in my 'Prosody of the Persians'.)

I. *Hasaj*.

1. مفاعیل 4 times (14).
2. مفاعیل 4 times (16).

II. *Rajas*.

3. مستفعلن 4 times (33).
5. مفععلن مفاعیل 2 times (36).
4. مفععلن 4 times (35).
6. مفاعیل مفععلن 2 times (37).
7. مفععلن مفععلن مفاعیل مفععلن (p. 37. l. 1.).

III. *Ramāl*.

8. فاعلاتن 4 times (41).
9. فعلاتن 4 times (43).
10. فعلاتن فعلاتن 2 times (46).
11. فاعلاتن فعلاتن فعلاتن فعلاتن (orig. form of 41).

IV. *Muzāra'*.

12. مفاعیل فاعلاتن 2 times, (orig. form of 67).

V. *Mujtass*.

13. مستفعلن فاعلاتن 2 times (76).
14. مفاعیل فعلاتن 2 times (76).

VI. *Khaṣṣf*.

15. فاعلاتن مفاعیل فعلاتن مفاعیل (a *muṣamman Khaṣṣf*, p. 59 note).

In the above fifteen metres, the four *Isāfats* of the verse must all be read; but as two may be left out, we get—

VII. '*Arā*.

16. مفاعیل فعولن 2 times (105).

VIII. '*Amīq*.

17. فاعلن فاعلاتن 2 times (106).

Mujtass Akhrab.

18. مفعول فاعلاتن 2 times (67).

And if only the last of the four *Isāfats* be left out, we have—

Rajas.

19. مفععلن مفععلن مفاعیل مفعولن (p. 38, 2nd line).

3. Shaikh Ḳuṭb-uddīn Munawwar, son of Burhān-uddīn, son of Shaikh Jamāl. He is as renowned a saint as his grandfather. He had been a disciple of Nizām-uddīn Auliya (the Dihlī saint), lived a retired life, and took no presents from kings. Muhammad Shāh Tughluḳ went personally to Hāṣi, in order to induce him to come with him to Dihlī. The meeting took place at Bhainī (بهینی), near Hāṣi, and is minutely related in the works on Indian Saints. Shaikh Ḳuṭb died in 760 H., (A. D. 1359), and lies buried at Hāṣi.

4. Ghulām 'Alī Bhīkan. He lived during the reign of Aurangzib, and compiled in 1113 H. (A. D. 1701) a Persian dictionary, entitled *Ashhar-ullughāt*.

5. 'Abdul-Wāsi'. His Persian grammar, entitled *Bidlāh-i-'Abdul-Wāsi* is read in every Madrasah in India. He also wrote in Persian an Urdū Dictionary of Technical (chiefly Agricultural*) Terms, which he entitled *Gharāib-ullughāt*. This book, copies of which are very rare, was criticized by Sirāj-uddīn 'Alī Khān Arzū in his *Nawādir-ul-Alfāz*, likewise a rare Urdū Dictionary of Technical Terms. Sir H. Elliot used the latter work extensively for his 'Supplemental Glossary.'

I now proceed to give my readings and translations of Mr. Delmerick's rubbings.

I.

From the Mīr Mīrān Sālārī Mosque, inside the fort of Hāṣi. One line, 4 ft. 11 in. by 7 in. The characters are rude, but clear.

امیرنا مسجد العبد علی بن اسفندیار فی عشر ذی الحجة سنه ثلث وتسعين
و خمس مایه //

The slave [of God] 'Alī, son of Isfandiyār, ordered the building of this mosque on the 10th Zil-Hajjah, 693. [23rd October, 1197.]

If the last be looked upon as awkward, we may double the 'Arz, and thus get
مفاعیلن فعولن 2 times.

If we had the whole ghazal, it is possible that we should have to modify one or two of the above 19 metres; but as it is, they suit the first hemistich.

The author of the *Haft Iqlīm* says that he knows nothing about Mughis, but he had often seen verses by him. He quotes the following (metre *Munsarīf*, مفتعلن فاعلن)—

چاک کند بابے جیب به بستان حسن • چون تو گله گر کشد سرز گرپهان حسن
ماید! لطف فیب شد چوبگیتی فراز • جای نمکدان نشست روی تو برخوان حسن
ملک دلبری حجت اول نداشت • داد نگینش کنون لعل تو از کان حسن

I have found in no other Tashkīrah notices of this poet.

* Hāṣi appears to have once been held in high estimation for its agricultural progress. Even at present Hāṣi cows are proverbial for their excellence.

This is the oldest Muhammadan inscription this side of Dihlī, that I have seen.

II.

From the Bū 'Alī Bakhsh Walī Mosque in the Mughalpārah Quarter of Hāpsī. Two lines, 2 ft. 6 in. by 7 in. The characters are rude.

هذا عبارة المسجد العبد الضعيف احمد بن محمد اسمندى في المنتصف ربيع الآخر
سنة ثلث والعشرين وستمائة //

This mosque was built by the weak slave Ahmad, son of Muhammad, of Asmand, in the middle of Rabi' II, 623. [Middle of April, 1226.]

Asmand is a small place near Samargand.

III.

Inscription from the Barsī (برسي) Gate in Hāpsī, to the left of the entrance. Barsī is the name of a place S. of Hāpsī. Three lines; 9 ft. 8 in. by 1 ft. 4 in. The same heavy characters as found on other inscriptions of 'Alā-uddīn's reign. *Vile Inscr. VI.*

بعهد مملکت بادشاه روي زمين * خدايان سالطين عالم دنيا و دين
ابو المظفر شاه جهان محمد شاه * که باد مملکتش جاودان بروی زمین
يگانہ خسرو گيهان سکندر ثاني * رسیده ميت معاليه ش تا بعلين
نفا نهاده شد اين بے نظير دروازه * کز ارتفاع بکيوں هي کند نمکين
بسمت حضرت دهلي کے هست دار الملک * * * * *
بسال هفصد و سه آمده عمارت اين

1. In the time of the reign of the king of the face of the earth, the lord of princes, 'Alā-uddunyā-waddīn,

2. Abul Muzaffar, the king of the world, Muhammad Shāh—may his kingdom be everlasting on the face of the earth!—,

3. The unrivalled, the master of the world, the second Alexander, the fame of whose great deeds has reached the highest heaven,

4. This gate which has no equal was erected and is from its height an honor to Saturn [the keeper of the seventh heaven],

5. On the road to Dihlī, the king's residence, which is the capital of the kingdom, * * * * * this strong fort [of Hāpsī]

6. * * * * * in the year 703 the edifice was erected. [A. D. 1303-4.]

No doubt, 'Alā-uddīn fortified Hāpsī as an outpost against the Mughuls.

IV.

From the Dīnī Mosque in the town of Hāpsī, near the Sarāgyān Mandir. Three lines, 2 ft. 9 in. by 1 ft. 4 in.

بنوفیق خدای علام و برکت مصطفی علیه السلام در عهد تیمون و دولت همايون
خدايان عالمشاه بادشاه اسلام راعي الانام ميروز شاه السلطان خلد الله مملكه و سلطانه

بندو درگاه ساهن سلطاني بتاريخ غرة ذي القعدة سنة سبع وستين و سبعمائة اين
مسجد بنا کرد ۱۱

By the grace of God the omniscient and the blessing of the chosen Prophet (upon whom be peace!), in the auspicious time and the august reign of the Lord, the king of the world, the king of Islām, the shepherd of the people, Fīrūz Shāh the king (may God perpetuate his kingdom and rule!), this mosque was erected by the slave of the throne Shāh an the Royal, on the 1st Zī Kā'dah, 767. [10th July, 1366.]

V.

From the Kuṭb Sāhib's Mosque, near the Dargāh of the four Kuṭbs, or saints, outside Hānsī, about forty paces from the Hānsī road. Eight lines, 2 ft. 7 in. by 11 in. Rude and indistinct characters.

الله الملك

بقرینق الله تعالى بندو درگاه سبجانی ابا بکر بام جاوانی که یک از مریدان پیر دستگیر
سلطان المشایخ شیخ ابوالفتح قدس الله سره العزیز است در پایان قطب اقطاب عالم
شیخ جمال الحق والشرع والدين غاب ثراه و جعل الجنة مثواه و نور الله مرقدوه
در وقت جلوس سجاده بندگی سلطان المشایخ شیخ فرید مد الله عمره این مسجد را
بنا کنانید - هر که درین مسجد نماز بگذارد بدعاى * * * یاد کند * کاتب حروف رضی
قطب نایب قاضی هانسی محله * * * شهنه * * * الخامس والعشرون من مائة رجب
وجب قدره سنة ست وتسعين و ثمانمائة سنکدراش امین بن * * * گوری ۱۱ .

God is the King !

By the grace of the great God, the slave of the throne of the Almighty, Abā Bakr Bāmjawānī, who is one of the disciples of the helping spiritual guide, the king of Shaikhs, Shaikh Abul-Fath (may God sanctify his dear secret!), had this mosque erected near the pole of the poles of the world, Shaikh Jamāl-uddīn (may the earth of his grave be perfumed, may God make paradise his mansion, and may God illuminate his resting-place!), at the time when the worshipful king of Shaikhs, Shaikh Farīd (may God lengthen his life!) succeeded as the spiritual ruler. He who reads a prayer in this mosque, should remember (the builder) with a pious wish.

The writer of these lines is Razā Kuṭb, the representative of the Qāsi of Hānsī in Mahallah * * * * police inspector * * * * on the 15th Rajab (may the honor of the month increase!) of the year 896. The engraver is Amīn, son of * * * Gori. [24th May, 1491.]

On the top, to the left of the words 'God is the King', in small characters—

در عهد بادشاه زمان سکندر شاه بن بهلول شاه سلطان خلد الله ملکه و سلطانه ۱۱

In the time of the king of the age, Sikandar Shāh, son of Buhlāl Shāh, the king, may God perpetuate his kingdom and rule !

I do not know what 'Bāmjawānī' is. If the ā in the second syllable were not long, I would read 'Abā Bakr nām jawānē,' a young man named Abā Bakr.

VI.

The following inscription is from the Barsí gate, to the right of the entrance. *Vide* above Inscr. III. Five lines, 1 ft. 2 in. by 1 ft. 6 in. The letters are chipped in places.

بناء عمارت این دروازه متین با مرمت علوی حصن حصین ملائی که مؤرخست منه
 انبی و سبعمایه در عهد سلطان السلاطین ابوالمظفر ابراهیم شاه سلطان خلد الله ملکه
 و سلطان نه در عمل مسند عالی حمید خان بالتحاب کامل و در شقداری خواجه محمد
 و برمایش * * * * * فی الخامس من شهر ذی القعدة سنة ثمان و عشرين
 و تسعمایه کاتب خانزاده نصر معنی هانوی ۱۱

The building of the edifice of this gate, together with the repairs of the upper strong fort built by 'Alá-uddín, which is dated 702 H., was * * in the reign of the king of kings Abul Muzaffar Ibrahim Sháh the king, may God perpetuate his kingdom and rule!—during the governorship of the Masnad-i-'Alí Hamíd Khán, with perfect choice, and during the *shikḥ-dárl* of Khwájah Muhammad, and by order of * * * on the 5th Zi Ka'dah, 928. The writer is Khánsádah Naḡr, Muftí of Hápsí. [26th September, 1522]

The correct year of the erection of 'Alá-uddín's fortification is 703 H., as given in Inscr. III.

VII.

From a Mosque near the Mirán Sálári Mosque. The stone is white marble and the letters are black and inlaid. Mr Delmerick sends the following reading—

سجدت لك شكرا و حمدا خادم الفقراء حسن رضا إحداث نمود ۱۰۹۷ هجری

I prostrate myself before Thee in thanks and in praise. The servant of the poor Hasan Rasá erected it. 1097 H. [1686, A. D.]

The following papers were read—

1. *Note on a Copper-plate Grant from the Cuttack Collectorate.*—By

BÁBU RANGALÁL BANERJEA.

(Abstract.)

The plates were found in the muniment room of the Cuttack Collectorate, but there is no record to show whence they came and to whom they belong. Probably they had been submitted as a document in support of a claim for some rent free land when the Province of Orissa was first settled at the beginning of this century, but were never after taken away, the object of the owner having been defeated owing to the absence of a person who could decypher the document. The inscription records the grant of a village named Chandra in the fiscal division of Marāḍa in the province of Dakshina Kosalā, which has been identified with the modern village of Chandrá in Marāḍa Hariharpur in the neighbourhood of Cuttack. The donor was

Yajáti the founder of the Kesari dynasty, who expelled the Buddhists and re-established Hinduism in Orissa about the close of the 5th century. Hitherto he has been supposed to have been an independent sovereign; but in the patent under notice he owns allegiance to Bhava Gupta of Magadha, and hence it would seem that it was a Hindu king of Magadha who overthrew the Buddhist sovereignty of Orissa and held the province as a dependency through a vassal. In the Temple records of Puri, the Buddhists are represented as Yavanas.

A Photozincograph will accompany the paper, which will appear in No. II of this year's Journal.

2. *On the Route between Soḥár and el-Bereymí in 'Oman, with a note on the Zaṭṭ, or gypsies, in Arabia.*—By COLONEL S. B. MILES, *Muskaṭ.*

(Abstract.)

Colonel Miles describes the route from Soḥár on the Persian Gulf, north of Muskaṭ, across the Jabal Akhdhar Range to el-Bereymí on the outskirts of the southern Arabian Desert. He refers to the antiquities of the coast, which before the spread of Islám was held by the Persians, and gives interesting notes on the places he passed, the customs of the people, the scenery and produce of the country, and the geology and fauna of the mountain tracts. A map accompanies the essay.

The paper concludes with a notice of the Zaṭṭ, or gypsies, of Arabia, whom Dr. Sprenger identifies with the Jats of India. They are at once distinguishable from the Arabs as a distinct race, and are numerous in Arabia. They are accomplished handicraftsmen, and are to the natives of the interior what the banians are in the seaport towns. They speak among themselves, as elsewhere, a gibberish of their own manufacture, the plan being to prefix to Arabic words the letter *m* and to suffix the syllable *cek*; thus the Arabic *ḵamar*, 'moon', becomes *mḵámareek*.

The paper will be shortly published in No. 1, Pt. I, of the Journal, for 1877.

MR. BLOCHMANN said—Several of the Zaṭṭ words given by Colonel Miles are corruptions of Arabic words; but some have no Arabic sound. The word for 'father' *bweieekes*, looks like the diminutive of *ab*, father, with the ending *kes*; other words as *ḥidámeh* (rice), *jarráḥah* (knife) are Arabic, but have in classical Arabic only kindred meanings.

It would be of interest to have the Zaṭṭ numerals, provided they do not use, when speaking among themselves, the Arabic numerals.

MR. W. T. BLANFORD said that Col. Miles's paper referred to a region of great interest, but of which very little was known. It was visited by Lieut. Wellsted, of the Indian Navy in 1835, and briefly described by him

in the Journal of the Royal Geographical Society for 1887, (Vol. VII. p. 102) and also in his "Travels in Arabia." Both Zoology and Geology require investigation. Mons. Aucher Eloy, a French botanical collector, visited the Muscat hills about 1837, and brought away specimens of a few animals, but his collections were small and imperfect. The hills look from Muscat as if they consisted partly of the dark limestone which forms the headland of Mussendom at the entrance to the Persian Gulf. Some fossils from this limestone were examined by Dr. Stoliczka and found to be Triassic.

LIBRARY.

The following additions have been made to the Library since the Meeting held in April last.

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The Rāmāyana, No. 6, Pt. 1.

THE EDITOR.

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No. 12. *MM. Becquerel et E. Becquerel*.—Observations de température faites au Muséum d'Histoire naturelle pendant l'année 1876 avec des thermomètres électriques placés à des profondeurs de 1 mètre à 36 mètres sous le sol, ainsi que dans l'air et sous des sols gazonnés et dénudés.

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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR JUNE, 1877.

The Monthly General Meeting of the Asiatic Society was held on Wednesday, the 6th April, at 9 P. M.

W. T. BLANFORD, Esq. F. R. S., Vice-President, in the chair.

The following presentations were announced :—

1. From Colonel S. B. Miles, Political Agent, Muscat, the Prithvi Ráj Rasau of Chand, and another MS.

The CHAIRMAN drew attention to the valuable nature of Col. Miles' gift, and said that the Council proposed that the special thanks of the Society should be given to Col. Miles for it. The proposal was put to the vote and carried unanimously.

2. From Mr. W. Theobald, a copy of his "Catalogue of the Land and Fresh-water Shells of British India."

3. From the Trustees of the Indian Museum, a copy of a Monograph of the Asiatic Chiroptera and Catalogue of the species of Bats in the Collection of the Indian Museum, Calcutta, by Dr. G. E. Dobson.

4. From Capt. J. Waterhouse, a Map of Turkey in Europe and the Black Sea, with the adjoining parts of Russia and Turkey in Asia.

5. From the Rev. C. H. A. Dall, "Scientific Results of the exploration of Alaska," Vol. I.

6. From Dr. Rájendralála Mitra, a copy of the Káyastha Kaustubha, by Rájnaráyan Mitra.

7. From Dr. A. F. Bradshaw, copies of the following works :

The Travels of Guru Tegh Bahádur and Guru Gobind Sing. By Sirdár Attar Sing

Sakhee Book, or the Description of Guru Gobind Singh's Religion and Doctrines. By Sirdár Attar Sing.

The Rayhitt Nama of Pralád Rái.

8. From the Secretary to the Government of Bombay, a copy of Inscriptions from the Kudá Caves taken by Mr. J. Burgess, Archæological Surveyor and Reporter to the Government.

The following gentlemen, duly proposed and seconded at the last Meeting, were balloted for and elected Ordinary Members :—

Mr. H. K. W. Arnold, the Maharájá of Darbhanga, Mr. A. W. Croft, (re-election).

The following is a candidate for ballot at the next meeting :—

Nawáb Asghar 'Alí Khán, Dilír Jang Bahádur, C. S. I., proposed by Dr Rájendralála Mitra, seconded by Capt. J. Waterhouse.

The SECRETARY laid before the Meeting a communication from Mr. W. McGregor on the subject of Lightning Conductors, accompanied by a copy of the following circular and memorandum of the British Association Committee on Atmospheric Electricity and Lightning-Rods.

"The Committee charged with this investigation and report desires to have as much information as possible regarding accidents from lightning. But in order that information of this class may possess scientific value, it is essential that all statements communicated should be clearly and definitely expressed, that they should be carefully authenticated, and that the address, as well as the name, of the observer should be given, to allow any further inquiry to be instituted that may be found to be desirable in the circumstances. The Committee has consequently drawn up the following memorandum to define the nature of the information it seeks, and earnestly requests that any person who may chance to know of accidents from lightning, or who may be able to give practical assistance in this inquiry, in the sense and particulars suggested by the memorandum, will address such communications, as they may be in a position to make on these subjects, to the Chairman of the Permanent Committee on Atmospheric Electricity and Lightning-rods. Meteorological Society, 80, Great George Street, Westminster, London."

*Memorandum of information required in any case of Accident
from Lightning.*

1. The day, hour, and place of the occurrence.
2. The exact nature of the occurrence, especially specifying any unusual appearance or sound that has attended the discharge of lightning.
3. A minute and precise description of any damage that may have been produced by the discharge.
4. Record of any visible traces of electrical action that may have been left in the track of the discharge.
5. (The names and addresses of any person who may have witnessed

the actual discharge producing damage, or who may have suffered in any way from its effects.

6. The existence or non-existence of a lightning-rod in any form in the immediate neighbourhood of the accidents, and an exact description of the rod when any such appendage has been ascertained to be near, especially as to—

- (a) the nature of the metal of which the rod is composed :
- (b) the size of the rod :
- (c) the character of the conductor, whether it has the form of a solid cylinder, of a tube, of a flat strip, of a chain, or of a wire-rope :
- (d) the actual continuity of the conductor from end to end :
- (e) the character of the termination above, and the distance to which it extends there beyond any building or solid structure :
- (f) the character of the termination below, whether in dry or moist ground, how it runs into the ground, and how the earth-contact is ultimately made :
- (g) the manner in which the conductor is connected with any building, and especially whether there are any masses of metal in the building near, and whether such masses are or are not placed in metallic communication with the conductor.

7. Allusion to the fact whether the injurious discharge did or did not form part of an ordinary thunder-storm in progress at the time.

8. In case of the occurrence of a thunder-storm in progress at the time of the discharge, a description of the character of the storm as to intensity, duration, fall of rain, and apparent movement over the locality.

9. Any subsidiary or incidental observations that may have been made and that may seem to bear practically upon the physical conditions and circumstances of the phenomenon.

Messrs. H. F. Blanford and Eliot have expressed their readiness to investigate, when practicable, cases of accidents from lightning occurring in Calcutta, and information on cases occurring there or in other parts of India may be sent to them at the Meteorological Office, Calcutta, or to Mr. W. McGregor, River View, Dhubri, Assam.

The CHAEMAN announced that Mr. J. C. Douglas had been appointed a Member of the Physical Science Committee, Mr. H. B. Medlicott of the Library Committee, and Mr. W. T. Blanford of the Finance Committee.

Also that on the recommendation of the Library Committee, the Council had passed an order that not more than two MSS. should be lent out at a time to the same person, except with the sanction of the Council.

Also that on the recommendation of the Natural History Committee, the Council had sanctioned the publication of Mr. Moore's Descriptions of the

new Species of *Lepidoptera* found in the late Mr. Atkinson's Collection, as a separate work in quarto form, to be brought out in fasciculi as funds permit.

Also that on the recommendation of the Library Committee, the Council had sanctioned the appointment of a special assistant under Mr. Blochmann for the preparation of the Library Catalogue.

The following papers were read :—

1. *On the Diameter of the Wire to be employed in winding an Electromagnet in order to produce the Maximum Magnetic Effect*. By R. S. BROUGH.

In 1866 Mr. Schwendler investigated the best galvanometer resistance to employ in testing with Wheatstone's Bridge, a question which was previously involved in complete obscurity, some physicists arguing that since near balance the current passing through the galvanometer approaches the indefinitely small, therefore the number of convolutions, and hence the the resistance, of the galvanometer ought to be indefinitely great.*

I may here remark that Count du Moncel in a communication to the Academy of Sciences has unjustly criticized Mr. Schwendler's method of treating the subject of electromagnets.† The latter supposed the dimensions of the bobbins (as I, also, do in this paper) to be given, fixed, and immutable; while the learned Count starts with varying the depth of the bobbin, and piques himself on getting a larger magnetic effect out of it than Mr. Schwendler did. The best thickness of wire to wind on a given bobbin, and the best size and shape of bobbin to employ for a given purpose, are two totally distinct questions.

While investigating the above problem, the question of the influence of the insulating covering of the wire on the results occurred to Mr. Schwendler, and he went into it in a subsequent paper.‡

Mr. Schwendler attacked the problem from the point of view of the resistance of the bobbin; but it seems to me that it yields more readily, and presents a more definite result (the former method gives an equation of the 4th order, which has to be solved by a rather coarse approximation) when we start from the thickness of the wire. This method has also led me to a singularly simple relation existing between the resistance of the electromagnet and the external resistance.

I shall take the case of an elongated bobbin with straight sides and circular ends, because this is a very common form to give to galvanometer coils, and because the results can at once be reduced to those applicable to

* Philosophical Magazine, May, 1866.

† Comptes Rendus, Vol. LXXVI, pp. 368-371.

‡ Philosophical Magazine, January 1867.

circular bobbins by simply putting the length of the sides equal to nothing in the various expressions.

Let Y = the magnetic effect of the bobbin

R = „ resistance „ „

S = „ external resistance.

E = e. m. f. of the battery.

and n = the number of convolutions.

Then (Jacobi and Dub)

$$Y = \frac{n E}{R + S}$$

and the problem is to make Y a maximum,* treating the diameter of the wire with which the bobbin is wound as the independent variable, of which n and R are known functions.

Let A = the outer diameter of the circular ends

a = „ inner „

b = „ length of the bobbin

c = „ „ „ straight sides between the circular ends

δ = „ diameter of the wire

ρ = „ radial thickness of the insulating covering

and L = the length of the wire on the bobbin

$$\text{Then, } n = \frac{b (A - a)}{2 (\delta + 2\rho)^2}$$

for each wire being allowed a square, the length of whose sides is equal to the diameter of the covered wire: and

$$L = \frac{b (A - a)}{2 (\delta + 2\rho)^2} \left\{ \frac{\pi (A + a)}{2} + 2c \right\}$$

But

$$R = \lambda \frac{4 L}{\pi \delta^2}$$

where λ is the specific resistance of the conducting material of the wire, i. e. the resistance between opposite faces of the unit cube of the conducting material.

Therefore

$$R = \frac{\lambda b (A - a)}{\pi \delta^2 (\delta + 2\rho)^2} \left\{ \pi (A + a) + 4c \right\}$$

We had

$$Y = \frac{n E}{R + S}$$

* The force exerted by a coil on a steel magnet is proportional to Y , whereas the force exerted on a soft iron armature is proportional to Y^2 ;* but whatever value of the variable makes Y a maximum, will also make Y^2 a maximum, so the one solution meets both cases.

$$\text{Put} \quad \theta = \frac{1}{Y}$$

$$\text{Then} \quad \theta = \left(\frac{R}{n} + \frac{S}{n} \right)^{-1} \frac{1}{E}$$

and it is required to make θ a minimum with respect to δ .

$$\text{Now} \quad \theta = \left(\frac{\lambda}{\pi \delta^2} \left\{ \pi (A + a) + 4c \right\} + \frac{(\delta + 2\rho)^2 S}{b (A - a)} \right) \frac{2}{E}$$

$$\frac{d\theta}{d\delta} = \left(-\frac{\lambda}{\pi \delta^3} \left\{ \pi (A + a) + 4c \right\} + \frac{(\delta + 2\rho)^2 S}{b (A - a)} \right) \frac{4}{E}$$

$$\text{and} \quad \frac{d^2\theta}{d\delta^2} = \left(\frac{3\lambda}{\pi \delta^4} \left\{ \pi (A + a) + 4c \right\} + \frac{S}{b (A - a)} \right) \frac{4}{E}$$

$$\text{Putting} \quad \frac{d\theta}{d\delta} = 0, \text{ we have}$$

$$\delta^2 (\delta + 2\rho) = \frac{\lambda b (A - a)}{\pi S} \left\{ \pi (A + a) + 4c \right\}$$

which equation expresses implicitly the value of δ which makes the magnetic effect a maximum.

Let us put $\frac{\rho}{\delta} = \mu$, then

$$\delta = \sqrt[4]{\frac{\lambda b (A - a)}{\pi (1 + 2\mu) S} \left\{ \pi (A + a) + 4c \right\}}$$

This expression for δ contains μ , itself a function of δ ; but a very simple artifice suffices to get over this difficulty. First suppose $\mu = 0$, and solve the equation: the result will be an approximate value of δ , namely, that which it would have, were there no insulating covering to the wire.

Then employing this approximate value of δ , calculate $\mu = \frac{\rho}{\delta}$; and recalculate the value of δ , using this value of μ .

By repeating this process, which involves very little trouble if logarithms be employed, any desired degree of accuracy may be attained.

From the above expression for δ we see that, so long as μ not = 0, the diameter of the wire (without its covering) will always be *less* than it would be were there no insulating covering.

The expression for the resistance of the bobbin may be written

$$R = \frac{\lambda b (A - a)}{\pi \delta^2 (1 + 2\mu)^2} \left\{ \pi (A + a) + 4c \right\}$$

and supplying its value for δ^2 , we find

$$R = \frac{1}{1 + 2\mu} S$$

from which it is seen that, so long as μ not = 0, the resistance of the bobbin

must always be *less* than the external resistance. Putting $\frac{\rho}{8}$ for μ , we have

$$R = \frac{\delta}{\delta + 2\rho} S$$

which expresses the physical law, namely, that

$$\frac{\text{Resistance of bobbin}}{\text{External resistance}} = \frac{\text{Diameter of bare wire}}{\text{Diameter of covered wire}}$$

2. *Remarks on Mr. Campbell's Paper on Himalayan Glaciation in the Journal of the Asiatic Society of Bengal, Pt. II, No. 1, 1877.* By W. THEOBALD, *Geological Survey of India.* Communicated by MR. H. F. BLANFORD.

As Mr. Medlicott in his note to Mr. Campbell's paper has termed it a refutation of my views on the ancient moraines of the Kangra district, I would beg to say a few words in arrest of judgment on this point and to show wherein Mr. Campbell has not only failed to controvert my position but even to grasp its cardinal features.

I do not propose to introduce any new matter in support of my own views but to confine myself to Mr. Campbell's criticism and the more clear explanation of my own position, which I regard as not materially weakened by anything my critic has adduced.

Mr. Medlicott, it is true, does not go the length that I do as regards the extension of glaciers formerly into the Kangra valley, and it is superfluous to admit the weight which such an opinion should carry, but the difference between us is one more of degree than anything else, and if I am not mistaken, Mr. Medlicott differs in an opposite direction no less from Mr. Campbell than from myself.

On the other hand, Mr. H. F. Blanford in the discussion on Mr. Campbell's paper spoke of glacial action so low as 4500 feet, which goes far to bridge over the gulf which separates my estimate of the former limits of glaciers in Kangra from the more restricted estimate currently held on the subject.

As for whether or no these glaciers protruded into the lower grounds ten miles or so, either beyond or within the general limits assigned to them by me, is, in view of their stupendous development, a matter of little importance, and neither under present conditions, either easy to settle or worth contending for, the main question being, did glaciers, during later tertiary times or more recently, descend in Northern India to so low a level as 2000 feet above the sea?

Much that I have seen since fully corroborates this view, and it only remains to glance at the arguments which Mr. Campbell has adduced against it.

Mr. Campbell evidently relies much on the weight which should attach to his extended experience and special study of glacial phenomena, but his remarks show that he has overlooked the most important elements in a comparison between the glaciated districts of Europe and the Himalayan region—*viz.*, the difference in the character of the rocks and the prodigious disparity of denudational action in the two regions. It is true he appeals to the latter in the form of floods as the motive power by which the Kangra erratics have been torn from the distant peaks and scattered over the plains, but wholly loses sight of it, when insisting on the absence of striated rocks and other surface indications relied on in Europe to establish the former extension of glaciers. The two arguments are mutually destructive, for a succession of such terrific debacles as could alone have effected the transportation of blocks up to 140 feet in girth, could have had no other effect than to obliterate all traces of the ice plough, on the absence of which Mr. Campbell relies to disprove the extension of the old glaciers.

Again, from the weight which Mr. Campbell attaches to the absence of striation in the rocks of the Kangra district, it is clear that he has failed to recognise the very obvious fact, that the rock (a granitoid gneiss) which has afforded the main bulk of the Kangra erratics is by its mineral character, incapable of affording the proofs sought for, since under atmospheric action it scales off and weathers into rounded masses which retain scarcely a trace of the original surface, which they possessed as ice-borne fragments. A similar inappreciation of the most obvious physical considerations involved in the problem of the past history and conditions of the rocks he was examining is betrayed by Mr. Campbell's searching the coarse boulder conglomerates, both of the Sivalik group and its overlying deposits, and the river shingle at Hardwár on the Ganges for striated blocks, where both the conditions and materials are such as to afford about as much chance of finding glacial striation on the pebbles (had such ever once existed,) as would be offered to any one searching with a similar object the boulders of the Chesil bank and Portland roads. As regards direct differences of opinion touching the facts of the case, Mr. Campbell says he could discover no 'perched' blocks. Mr. Medlicott, who it may be supposed knows a 'perched' block when he sees one, was more fortunate. Equally unable was Mr. Campbell to find even "one hog-backed ridge," the form which I have said distinguishes the best marked moraines in Kangra. One such is at Dhada, and here Mr. Campbell could see nothing but a V gorge. Now the V gorge is there I admit; but it is cut out of the huge linear talus, hog-backed in section, which, I hold, marks the course of an old moraine. It is this Dhada section, as interpreted by Mr. Campbell, which shows that he has wholly failed to grasp my idea of the palaeogeography of the district. Mr. Camp-

bell's words are, "Close to the bridge I found a section of the 'big stone formation' and got to the solid rock surface under it, newly exposed in a gravel pit. The stuff is sorted in layers of varying coarseness from fine angular sand to the big stones. The bed is *not* glaciated. The thickness of the deposit may be 80 to 90 feet."

Now if Mr. Campbell had studied my paper carefully, he would have seen that I place the level along which the old glaciers descended, at approximately 150 feet *above* the present stream beds; and as the thickness of the whole mass at Dhada is placed by him at 90 feet, the great bulk of this moraine has at this spot suffered rearrangement by water and subsidence, the original bed along which it descended, and where alone glaciation might be looked for, having been much above the existing surface level of the country; this *rather* important element in my view of the case Mr. Campbell entirely overlooks, and actually confounds together the present V gorge with the long-vanished slopes, over which the glaciers descended, at a level roughly estimated by me at 150 feet above the present river beds.

This last estimate is of course conjectural and open to modification, but it represents the amount of vertical erosion since the retrocession of the glaciers and must be very considerable.

Lastly, I would say that I neither underrate or question the power of water confined in a gorge to move very large blocks. Mr. Campbell uses the term rather vaguely, though he specifies blocks of 14 and 15 feet diameter, or say roundly 50 feet in girth. These and much larger ones may, I repeat, be moved *down a gorge* by the action of water, but when one finds blocks ranging from 100 to 140 feet in girth standing in open ground, I frankly confess I can recognise no vehicle of transport equal to the occasion save ice.

Without going into details, there is one important correction which I may here make as regards the relative age of the glacial period in Kangra and the Sivalik group. In my paper I incline to the post-glacial age of the group, on confessedly inadequate evidence. Since then, the occurrence of what I hold to be glacial debris, strewed over the denuded edges of Sivalik strata, has led me to accept the view, so ably urged by Mr. Medlicott in his note to my paper, which identified the glacial period in Kangra with that of European Geology, and if this be so, I see no grounds for questioning the former extension of glaciers in India, on as grand or even far grander scale than they attained in the comparatively dwarfish ranges of Europe—though my largest estimate dwindles to insignificance before the vision of the great ice-cap 10,000 feet thick, stretched from the equator to the pole, which Mr. Campbell has (somewhat unnecessarily in my opinion) laboured to efface. The correlation too, of the Kangra glacial period with the European does away with the necessity of supposing a former,

elevation of the country, equivalent to a reduction of temperature calculated by Mr. H. F. Blanford at about 20° Fahr., and reduces the difficulties surrounding the question, and the differences of opinion of all save extreme anti-glacialists within very much narrower bounds.

3. *Remarks on the Abstract and discussion of Dr. O. Feistmantel's Paper, entitled "Giant-Kettles (pot-holes) caused by Water-action in Streams in the Rájmahal Hills, and Barúkar district."* By V. BALL, M. A., F. G. S., *Geological Survey of India.*

As I was not present at the meeting of the Society in March when the above-mentioned paper by Dr. Feistmantel was read, I wish it to be understood that the following remarks are based on the published abstract* of the paper and the account of the discussion which followed it.

Dr. Feistmantel claims for his observations an originality and importance which, I think, I shall be able to shew they do not possess.

Ordinarily speaking, if an author can be found to write and a Society to print a paper on a subject like the above, there might perhaps be no good reason for special remark or criticism. The paper may be in itself a valuable contribution to knowledge. It is because the writer, inferentially if not directly, casts a slur upon a Department, and the Society is one in which many of the members of that Department take a warm interest—that the occasion seems a fitting one for protest.

If the phenomena were of such rarity and importance as is stated, it would have been an act of grave omission on the part of the officers of the Geological Survey not to have described them in full detail on every occasion that they met with them.

A geologist, in India especially, where large areas have to be described, must however use some judgment in the selection of phenomena for description. I think I may say that Pot-holes are one of those which may safely be relegated to a minor position and passed with little or no notice.

The origin of many simple phenomena of denudation, erosion or deposition are subjects suitable for description in elementary manuals; but if all this A. B. C. is to be reopened and discussed and supported by tables of measurements in every descriptive memoir; what will be the length of such pre-Raphaelite descriptions? and where will they find a period?

I am sure there is not a member of the Geological Survey who would not be ready* to support the statement made at the meeting by Mr. H. Blanford to the effect that "the phenomena were exceedingly common and their explanation generally obvious." This assurance one would have thought, from so competent an authority, ought to have been suffi-

cient to settle the question ; but as Dr. Feistmantel has expressed a doubt regarding its correctness I purpose to give some evidence on the subject.

My reason for taking upon myself this somewhat ungracious task, is that the statements made in the paper appear to affect me slightly more directly than they do most of my colleagues. Before my recently published memoir on the Rajmahal hills went to press, Dr. Feistmantel described to me the pot-holes he had observed in that part of the country. Apparently he quite forgets that I told him that I had not only observed them there, but also in many other parts of India.

It would be very much easier to enumerate a list of places where pot-holes are to be found in India than to produce a similar number of published notices of them, simply because they have not been thought worthy of mention. They are just the objects which would be likely to attract the notice of an amateur, while weightier and more important phenomena were left to explain themselves. It is no matter for surprise, therefore, that Dr. Feistmantel should find a reference to an amateur who has mentioned pot-holes, but it is very great matter for surprise that he should not have very carefully examined the publications of the Geological Survey before permitting himself to make the statements he appears to have made in reply to Mr. Blanford. Two of the references I shall give are to papers published since Dr. Feistmantel's arrival in India. It is possible that the *Memoirs and Records* may contain others, if they do not, it is for the reason above given. Out of the Survey publications too, there are at least two known references to the subject ; but I shall confine myself to the officers of the Survey for affording evidence of the abundance and very general distribution of Pot-holes in India.

The first witness I propose to quote is Dr. Feistmantel himself. Since his arrival in India he has on two occasions *only* made short tours in the rocky districts of Bengal. On both these occasions he has, in totally different formations, observed series of pot-holes which have supplied the text for his paper. Yet in spite of this fact, and positive assurance to the contrary, he maintains that the phenomena must be of rare occurrence in India.

Of published notices by officers of the Survey I only quote four, the first two have been pointed out to me, the others were known to me for reasons that will be obvious. In the *Geology of Trichinopoly, &c.*, by Messrs. King and Foote, we find the following passage: " In the first small nullah which runs under the high road about 1½ miles east of Vellum, and reaches the low ground to the north of Pullayaputty, are several small but well marked and instructive examples of pot-holes formed by the grinding action of pebbles rapidly rotated by the eddies in the stream. In several of the pot-holes the pebbles were still lying, the force of the

stream not having been sufficient to wash them out of the steep-sided holes they had been instrumental in scooping." In his recently published account of the South Mahratta country,* Mr. Foote has mentioned pot-holes twice.

Describing the remarkable scenery in the neighbourhood of the falls of Gokak on the Ghatpraba river, he writes "For some distance above the fall, the water runs at a very great pace, and has in consequence worn many fine specimens of pot-holes in the very hard quartzite, some beds of which, both here and in many neighbouring sections, are typical 'waxy' quartzites showing beautifully preserved rippling. These pot-holes are very favourite bathing-places for numerous Brahmans and others, who perform semi-religious pic-nics at this lovely spot in honor of Malingeshwar" (p. 88). Again speaking of the Malprabha river we find—"During great floods the water rises from 30 to 40 feet in the gorge, and flows with great impetuosity, forming numerous pot-holes of great size and depth which, as at the Gokak falls, are at certain seasons largely resorted to by Hindus anxious to wash away their sins in the purifying river." (p. 99.) There is nothing here to suggest that Mr. Foote regarded the phenomena as exceptional or requiring any elaborate explanation.

In the year 1864, shortly after my arrival in the country, I joined Mr. Hughes who was at that time engaged in the examination of the Bokaro coal-field. I can remember very distinctly being much struck with the pot-holes we met with in several river-beds, and on turning to Mr. Hughes' memoir, I find the following allusion: "The felspathic sandstone holds steadily on down the stream, worn into hollows of every conceivable shape: pot-holes meet one at every step."†

In my description of the Raigarh and Hingir Coal-field,‡ when pointing out the lithological and structural characters of the upper sandstones (Kamthis), I have written as follows—"Mechanically formed pot-holes are, for some reason which I cannot explain, less common than in the Barákar rocks."

Here, it will be observed, I have made the scarcity of these pot-holes a subject for comment, an abundance of them being the more normal state of things.

Dr. Feistmantel has expressed an unwillingness to receive assurances that these are common phenomena unless such assurances are accompanied by accurate measurements. Such details I am not at the present moment prepared to give, but I must assert here, most positively, that there is not a single formation in India which I have examined, in which, where the

* Memoirs, Vol. XII.

† Memoirs, Vol. VI, p. 91.

‡ Records, Vol. VIII, p. 114.

conditions have been favourable, I have not observed pot-holes. I can recall very many localities, some of them met with only during the present year, in quartzites of Vindhyan age.

Pot-holes may be rare in European streams from various reasons, but where the conditions are favorable they must, like other forms of erosion, irresistibly be produced. Although unable to quote instances from personal observation in streams, I have seen not a few on the sea coast where the necessary movement to the pebbles is caused by the ebb and flow of the tide or by currents. Some of those that I can remember were in Cambrian quartzites in the Bay of Dublin, where they often formed natural aquaria which could be visited at low tide and generally yielded marine animals. When the growth of weeds or zoophytes at the sides or bottom prevents the further revolution of pebbles, such pot-holes cease to increase their dimensions.

In limestone rocks similar holes may at times be observed, but though in some cases mechanical action may have had much to do with their formation, chemical solution may have been the more efficient factor.

For the benefit of any future historian I add the following facts which may find a place in a chapter on the economic uses subserved by pot-holes in India. Besides their more common employment as bathing-places and substitutes for clothes-washing tubs, the smaller ones are much used by the jungly aboriginal tribes for preparing the wild arrow-root or *tekur*. The roots are pounded and crushed in these natural mortars, the stringy portions are removed and the farinaceous feculæ allowed to subside at the bottom of the water. My attention has frequently been drawn to this mode of using them by the peculiarly offensive odour which arises from the refuse in this manufacture. They are also often used for steeping the roots or bark of certain trees the decoction from which is employed largely in poisoning fish in the streams.

Dr. FEISTMANTEL said he was very much obliged to Mr. Ball for the information regarding the mentioned cases of pot-holes which he had omitted to notice, he greatly regretted not having known them, but they still did not prove that the pot-holes are so worthless and uninteresting a subject as it would seem from the remarks of Mr. Ball and Mr. H. F. Blanford, the more so, if we consider all the papers which have been written by well-known authors on this subject, not only on pot-holes unconnected now with any water action, but also on those formed at present in streams and under glaciers. His only intention was and is, to describe and illustrate properly some cases of Indian pot-holes (which up to date has not been done) that might be referred to in future, and that European geologists may know of instances of pot-holes in India, which they certainly will not consider as completely without interest; the sketches will prove still more interesting.

He regretted the more having omitted to quote the "*en passant*" notices of pot-holes in the Survey Memoirs, as they gave to Mr. Ball the occasion for his remarks, in which, however, that gentleman has not added any explanation on the subject, but on the contrary has treated it quite as a personal affair.

While admitting that he had been ignorant of four or five mentions of pot-holes, he imagined that Mr. Ball was unacquainted with a much larger series of papers treating on this subject, which he would therefore recommend to his consideration (Dr. Feistmantel read a list of these papers). They all show that pot-holes were considered *worth description* from long ago up to the present date, although they are so common; even the most common phenomena must be described in order to be known.

Therefore, Dr. Feistmantel said, his principle would always be to *examine all phenomena, even if they be very common*, as circumstances may often make them become very important, as an instance of which he might mention the re-discovery of *Glossopteris*, thought by some authors palæozoic, in the Keuperic Panchet group, and the discovery of it in the Middle Jurassic Jabalpur group, on which he would have something to say on a future occasion.

Mr. H. F. BLANFORD drew attention to the report of Dr. Feistmantel's remarks in the March Proceedings of the Society, and especially the following passage "Dr. Feistmantel said he very much doubted whether Mr. H. F. Blanford's statements that these pot-holes are exceedingly common, is correct; otherwise they would have been more frequently noticed and described." Dr. Feistmantel's industry in collecting the very long list of papers on the subject, only a portion of which time would allow of his even enumerating by their titles, had now afforded the most complete refutation of the grounds of his opinion above given, that could possibly be desired; and, as regards India, Mr. Ball's paper just read, would probably be thought equally conclusive. In his own remarks, to which Dr. Feistmantel had taken objection, he had however spoken only of the results of his personal experience. In North Wales, where he had done his earliest work in field geology, pot-holes were exceedingly common; in Cornwall, where his next work was done, they were also very common; and in every part of India in which it had been his fortune to work at field geology, the same rule held good.

It is then amply established that in Europe, as in India, pot-holes in streams are so common, that it is rather a matter for surprise that there is such an extensive literature on the subject as Dr. Feistmantel has adduced. In part, this is perhaps due to the somewhat undue attention given to minutiae in certain schools of Geology. He had accompanied one of the writers quoted by Dr. Feistmantel, in geological excursions with his class,

and having himself then recently left the School of Mines in London, he had been much struck with what appeared to him to be the undue amount of attention given to little details, which any one might observe for himself, and the slight amount of attention given to the geological structure of the country, its orographical features and similar matters of high importance, but less obvious, especially to students. But he also thought it probable that Dr. Feistmantel had somewhat confused his authorities. The formation of pot-holes in streams was an obvious phenomenon, which is almost too common to deserve notice, but he understood that the point of many of the communications enumerated by Dr. Feistmantel was, that the holes described occurred in places where it was impossible to account for them by stream action, which is a very different matter; and which would furnish a reasonable ground for describing them. But in that case, they were clearly irrelevant as affording a justification for the publication of elaborate descriptions of pot-holes occurring in streams.

Mr. W. T. BLANFORD said,—I agree fully with Mr. Ball, and I can confirm his remarks on the common occurrence of pot-holes both in streams and on the sea coast. I believe it would be difficult to find a rocky stream in the country in which none occur. He is undoubtedly correct also in the reasons he has assigned for the paucity of notices of those phenomena in the published memoirs of the Survey. It would be absurd to devote space to the record of useless details about a common form of erosion with which geologists are familiar, and which has been well known and explained in elementary works for at least a quarter of a century.

The greater part of the papers by European geologists which are quoted by Dr. Feistmantel appear to me to refer to a different subject. He has described pot-holes in streams, with which all field geologists are well acquainted, and the origin of which is obvious; the European and American writers have described holes on hill sides, and even on the summit of a watershed, a very different matter. The latter is the case with the papers by Brögger and Reusch, Helmersen, and Jackson, or with three out of the five papers mentioned by Dr. Feistmantel in the Proceedings, and the other two are only short notes.

Mr. BALL said:—After the remarks of Mr. H. Blanford and of the Chairman I do not think there is anything left for me to reply to. Dr. Feistmantel's paper may be a valuable one, that is not the question. My object has simply been to point out certain errors of fact published in the Proceedings. I have to regret that Dr. Feistmantel has not, apparently, quite understood this to be the sole object of my paper, and has not availed himself more completely of the opportunity which has now been afforded him of withdrawing his former statements, which are justly objected to by, I believe, most of the members of the Geological Survey.

4. *Some notes on Birds of the Genera Pellorneum and Pomatorhinus, with a description of a variety of Chleusasicus ruficeps, Blyth.* By MAJOR H. H. GODWIN-AUSTEN, F. R. G. S.

Since writing the remarks on the genus *Pellorneum* published in Part II, No. 1 of the Journal for this year, I have, I think, determined a bird among those collected by Mr. Ossian Limborg on and under the Mulé-it range, Tenasserim, as the *Pellorneum Tickelli* of Blyth, originally from the same locality, where it was obtained by Capt. Tickell. This is not a *Pellorneum* but should, I consider, be placed in the genus *Alcippe*.

Its having been first placed in the genus *Pellorneum* is, I suspect, the reason (as it was in my own case) of the considerable confusion that has arisen regarding it, and led me and others to think *Pellorneum Tickelli* possessed the striated frontal plumage seen in typical *P. ruficeps*. Blyth commences his description of *P. Tickelli* by saying "absolutely identical in structure with *P. ruficeps*"; this, though it is clear enough on careful reading that Blyth was not alluding to coloration, yet brings *P. ruficeps* and its allies vividly to the mind. No mention is made of any markings on the breast; the description being in fact that of a dull-plumaged bird about which very few lines could be given. Mr. Oates appears to have recognized the species, and, in his list of Birds from Upper Pegu (Stray Feathers, Vol. III. p. 119), finds fault with the describer by saying—"agrees pretty well with Blyth's meagre description"; but this meagre description is almost as much as could be written about so dull-plumaged a bird, and, supplemented by that of Captain Tickell, is ample. In fact, it applies exceedingly well, even to the measurements, to the specimens we have lately received, and of which I give some account and the dimensions below. When this identification was made, I remembered that in the Museum we possessed two very similar mounted but unnamed birds (No. 852a), the history of which had been lost; on comparison they proved identical with the Tenasserim form and are very probably the original type specimens, the labels of which have been destroyed since Blyth described them.

Mr. Oates, in S. F. Vol. IV, p. 406, again calls attention to the two birds, and in continuation of his original identification of *Pellorneum Tickelli*, gives some account of the specimens in his possession, but he is perfectly wrong and unjust in his strictures when he takes Lord Tweeddale to task for making *P. Tickelli* equal to *P. subochraceum*, for if he will turn again to J. A. S. B. 1875, p. 114, he will find that it was Mr. Blyth who made this identification.

Lord Tweeddale had never seen a specimen of *P. Tickelli* but naturally thought that Blyth knew his own species. Therefore, assuming Mr. Blyth was right, and as *P. minor* (*rectius minus*) and *P. subochraceum* were known

to be the same, the next species was referred to *Tickelli*; and only this part appears within brackets. The 4th *Pellorneum* in my last paper should stand as *P. subochraceum*, Swin., originally described from Tenasserim, while *P. Tickelli* should be removed to the genus *Alcippe* with its near allies, *A. Phayrei*, *A. affinis*, *A. albogularis*, &c.

ALCIPPE TICKELLI, Blyth.

Desc.—Above all olivaceous brown, wings and tail more of an umber-colour, the feathers of the head and back are very indistinctly pale-shafted; frontal margin, lores, and round the eye, buff with a ruddyish tinge; the same ochraceous colour tinges the chin and throat and under parts, darker on the flanks and whitish on centre of the abdomen.

Bill above horny brown, pale fleshy white below. Irides light brown.

Length about 4·8; wing 2·5; tail 2·1; tarsus 1·0, bill at front 0·60 inches.

HAB.—Near Mitán on the Houngdarao River, Tenasserim.

A specimen of *Pomatorhinus hypoleucus*, var. Blyth = *Tickelli*, Hume, lately described in *Stray Feathers*, Vol. V. p. 82, in the middle of 'A List of Birds of North Eastern Cachar', is in the Indian Museum among Blyth's types, together with the two type specimens of true *P. hypoleucus* from Arakan sent by Capt. A. Phayre. The specimen agrees in measurement and in every way with the original description and is undoubtedly the very bird Blyth described. It is a well marked species. With regard to Mr. Hume's *Pom. Inglisi* described in the same publication, I may state that the description of *P. hypoleucus* in the 'Ibis', was made by Jerdon from a bird in my collection obtained at Asálu in the North Cachar Hills when Dr. Jerdon was staying with me at Cherra Púnjí in 1869; and I have a water-colour sketch of the head of the bird made just after it was shot. I think it premature to separate this from the Arakan bird until we can compare it with fresh examples from the original locality. The two type-specimens mentioned above are not in a state to enable us to do this in a satisfactory manner, having become bleached—the whole upper parts being of the same rusty hue throughout and all the grey having vanished from out of the lower plumage. The amount of rufous on the side of the head is a varying quantity. In my Asálu bird it is, as described by Mr. Hume, very faintly indicated, and Jerdon, not always very minute in his descriptions and with sight then becoming impaired, overlooked it. In specimens I now have by me, from the Nágá Hills, many miles to the east, the rufous patch on the neck and the rufous line from behind the eye are very strongly and intensely developed.

CHLEUSIUS RUFICEPS, Blyth, var. ATROSUPERCILLARIS.

No mention being made of the black eyebrow in the original description.

of *O. ruficeps*, and finding it absent in the type in the Indian Museum, I now describe the variety from Sadiya, Upper Assam.

Desc.—Bright ferruginous on the head, same colour paler on the nape and ear-coverts; back and wings pale olive-brown; quills tinged rufous; tail brown; a narrow black streak over the eye beneath dull white with an earthy tinge.

Legs dark plumbeous.

Length about 6; wing 2·85; tail 3·3; tarsus 0·90; bill at front 0·43 inches.

Larger than *Oh. ruficeps* and not so white below.

Mr. W. T. BLANFORD said he was afraid that he had been to some extent the cause of the confusion about *Pellorneum Tickelli*. Some years ago, he had suggested (Ibis 1872, p. 87) that *Pellorneum subochraceum* of Swinhoe was the same species. Dr. Jerdon went rather farther and, in his 'Supplementary Notes', stated that the two species had been pronounced identical. The same view was accepted by Mr. Blyth in his 'Mammals and Birds of Burma.' It is therefore not surprising that, when *P. subochraceum* was re-discovered, Mr. Hume gave it a fresh name and called it *P. minor*. It is most satisfactory to have obtained again typical specimens of both species from the original locality and to have cleared up the synonymy.

5. *On an apparently undescribed Weasel from Yarkand.* By W. T. BLANFORD, F. R. S.

Mr. W. T. BLANFORD gave a description of an apparently new weasel from Yarkand. A skin was contained in the collections made by Dr. Stoliczka, but as the animal had been kept in confinement, it did not appear desirable to describe it as new, and it was not quite certain that it was more than a variety of *Mustela vulgaris*. A second specimen brought by Dr. Scully, which was precisely similar to the first, had proved on more careful comparison to be considerably larger than *M. vulgaris*, besides being of a very different colour, and having a proportionably longer tail. It was proposed to name this after Dr. Stoliczka. It might be briefly described thus:

Mustela Stoliczkana, sp. nov. Pale sandy brown above, white below, tail coloured like the back throughout and about $\frac{1}{2}$ the whole length, feet well clad with long hairs beneath. Size larger than *M. vulgaris*, about equal to *M. erminea*.

Dr. ANDERSON exhibited a living, adult female Bamboo-rat which had recently been sent to the Zoological Gardens, Alipore, by Mr. A. H. Hildebrand, Asst. Commissioner, Burma. No details regarding the habitat of the animal had been as yet received, beyond that it had been obtained

from the Salwin Hill Tracts. Dr. Anderson pointed out that Sir Stamford Raffles had described a bamboo-rat, apparently from Malacca, under the name of *Mus Sumatrensis*, and that the drawing of this form by Major Farguhar to which Sir Stamford Raffles refers in his "Descriptive Catalogue* of a Zoological Collection made in Sumatra", is now in the library of the Royal Asiatic Society of London. This drawing Dr. Anderson had recently examined and he was thus enabled to state that while certain bamboo-rats from Malacca in the Indian Museum agreed with the drawing, the present living example from the Salwin Hill Tracts did not, and that there was a bamboo-rat in the Indian Museum from Tenasserim referred to *Rhizomys Sumatrensis*, but which differed from the Malacca specimens and agreed with the living animal now before the Society. Dr. Anderson was therefore inclined to consider that two species had been confounded with each other under *R. Sumatrensis*. McLelland, however, had described a bamboo-rat from Tenasserim as distinct from *R. Sumatrensis*, but Dr. Anderson had not been able to identify *R. cinerea*, McLelland, with the Museum Tenasserim specimen nor with the living animal from the Salwin Hill Tracts. This form from the Salwin and Tenasserim is distinguished from *R. Sumatrensis* by its bright golden red cheeks and sides of the head generally, by the absence of white spots on the forehead, and by the dark iron-grey of the upper parts (many of the hairs being white-tipped) becoming almost black on the top of the head, where it abruptly ceases between the eyes in a sharp well-defined point. The upper lip, chin, and upper part of throat white, also the chest and belly, which are, however, more or less tinged with grey and reddish. Lower portion of throat dark grey. The feet are sparsely clad and leaden coloured, except the toes of the hind foot, which are fleshy white. The tail is rather thick at the base, quite naked, not scaly, and of a leaden hue. Claws rather broad and moderately strong.

Measurements of the living adult ♀ specimen

Tip of nose to ending of hair over root of tail,	14.75
Ending of hair of body to tip of tail,	5.85
Length of hind foot,	2.56
Height of ear,	0.80
Breadth of ear,	0.64
Tip of nose to anterior angle of eye,	1.81
Posterior angle of eye to ear,	1.29
Length of eye,	0.89
Breadth between eyes,	1.38
" " external margin of nostrils,	0.50
" " ears,	2.10
" of tail at base,	0.77

* Trans. Lin. Soc. London, Vol. XIII (182), p. 258.

If *B. cinereus* does not prove to be distinct from *B. Sumatrensis*, Dr. Anderson proposed to designate this red-cheeked bamboo-rat *Rhizomys erythrogenys*.

LIBRARY.

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Pt. IV. *S. H. Scudder*.—A century of Orthoptera.—On Sparagomon, a genus of *Edipodidae*. Revision of two American Genera of *Edipodidae*. *J. H. Emerton*.—Structure of the Palpus of male Spiders.

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- DANVERS, JULIAN. *Report to the Secretary of State for India in Council on Railways in India for the year 1875-76.* London, 1876. P. P.
- GRIMBLAT, M. P. *Sept Suttas Pâlis tirés du Digha-Nikâya.* 8vo. Paris, 1876.
- INDIA, statement exhibiting the Moral and Material Progress and Condition of, during 1874-75. P. P.
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- REPORT. *On Sanitary Measures in India in 1874-75, together with Miscellaneous information up to June 1876, Vol. VIII.* 1876. P. P.
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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR JULY, 1877.

The monthly General Meeting of the Asiatic Society was held on Wednesday, the 4th July, at 9-15 P. M.

RAI RAJENDRALALA MITRA, BAHÁDÚR, D. L., Vice-President, in the Chair.

The following presentations were announced —

1. From the Author, "Religious and Moral Sentiments metrically rendered from Sanskrit writers," by Dr J. Muir.

2. From the Home Department, Government of India. A set of Photographs of the Paintings at the Ajunta Caves, and a "Grammar of the Rong (Lepcha) Language, as it exists in the Dorjeling and Sikim Hills," by Colonel G. B. Mainwaring.

The CHAIRMAN remarked that it was in 1865 that the Society recommended to the notice of Government Colonel Mainwaring's Dictionary and Grammar of the Lepcha language, and obtained the sanction of a grant for their publication. The Society also moved the Government to allow Colonel Mainwaring to remain at Darjiling for the purpose of revising and completing his works. Circumstances had since occurred to delay the undertakings a great deal. He was, however, glad to be able to congratulate the Society on the completion of one of the works. He hoped the other would be soon out of press.

3. From the Right Hon'ble the Secretary of State for India, a copy of the Archaeological Survey of Western India. Report on the Antiquities of Kathiawád and Kach, being the result of the second season's operations of the Archaeological Survey of Western India, 1874-75. By J. Burgess.

4. From the Government of Bombay, a copy of Inscriptions from the large Cave at Managhát, taken by Mr. J. Burgess.

5. From Commander A. Dundas Taylor, I. N., Superintendent of Marine Surveys, the following Charts :

False Point Anchorage. Goa and Marmagoa Roadsteads. Karachi to Vingorla. Vingorla to Cape Comorin. False Point to Mutlah River. Curves of equal Magnetic Variations for 1877.

6. From Bábu Gunendranáth Tagore, an engraving of the late Mahárájá Dwarkanáth Tagore.

The following gentleman, duly proposed and seconded at the last Meeting, was elected an Ordinary Member—

Nawáb Asghar 'Alí Khán Diler-jang Bahádúr, C. S. I.

The following gentlemen are candidates for ballot at the next meeting—

C. T. Peters, M. B., Surgeon, the P. W. O. Grenadiers, N. I., Belgaum, proposed by Capt. J. Waterhouse, seconded by Mr. H. Blochmann.

J. C. Reeves, Esq., Assistant Engineer, P. W. D., proposed by Mr. E. W. Oates, seconded by Mr. J. Wood-Mason.

Bábu Máharáichandra Vára, Pleader, High Court, Pingála, Mid-nipur, proposed by Bábu Pratápathandra Ghosha, seconded by Mr. H. Blochmann.

Dr. J. F. P. McConnell has intimated his desire to withdraw from the Society.

Mr. BLOCHMANN exhibited an impression taken by General Cunningham from a rupee struck by Muhammad 'Adil Sháh. He said—

General Cunningham has sent me an impression of a complete rupee (new variety) struck by Muhammad 'Adil Sháh, or 'Adlí, as he is often called, which adds a little to our knowledge of the history of that period.

The rupee is of the same size as the Islám Sháhí Rupee, published by Mr. Thomas in his 'Chronicles,' p. 411 and Pl. V, 190. The obverse is in fact identical.

OBVERSE—*Square area*, لا اله الا الله محمد رسول الله

Margin, ابابكر الصديق عمر الفاروق عثمان العفان علي المرتضي

REVERSE—*Margin*, مبارز الدنيا والدين ابوالمظفر

Square Area, سلطان محمد خلد الله ملكه و سلطانه و

علي المومنين

The full name of Muhammad 'Adil Sháh, therefore, is Mubáriz-uddín Abul-Muzaffar Muhammad 'Adil Sháh. The *personal* name was, no doubt, suggested by his real name, 'Mubáriz Khán'.

Regarding the year 961 and the 'Seal of Solomon' after the word *و* in the margin, *vide* J. A. S. B., 1875, Pt. I, p. 298.

Mr. W. T. BLANFORD exhibited a collection of pottery and various implements of stone, including flint knives, together with agate beads, copper ornaments, coins, &c. found by Major E. Mockler, Political Agent at Gwádar, amongst the ruins of dwelling places and tombs in various parts of Makrán (Balúchistán). Mr. Blanford said—

It is nearly a year since I had the pleasure of announcing to the Society* some of the results of Major Mockler's researches amongst the ruins of tombs and other buildings in Makrán. I then exhibited some drawings of these ancient remains and of the articles found in them. A fuller account has since been published in the Journal of the Royal Asiatic Society. I have now the pleasure of exhibiting not only the original collection made by Major Mockler at Sutkágen Dor, Dámbe Koh and some other places, but several additions to his former discoveries.

Amongst the specimens on the table from Sutkágen Dor, 40 miles northwest of Gwádar, are some very well shaped flint knives, precisely such as we might expect to have been split off from such cores as those from Sakhar on the Indus, which I exhibited in 1875,† and which are now in the Geological Museum. These knives were found together with several articles of pottery (apparently made on a wheel,) one of the best of which is a vessel resembling a drinking cup, (Pl. II, fig. 1) whilst some are extremely small, about an inch in diameter, and are considered by Major Mockler children's toys. They might perhaps have been intended to hold offerings to minor deities. Other articles found at Sutkágen Dor comprise cubes like dice cut in stone, stone and pottery beads, spheres of burnt clay resembling marbles and a few fragments of copper ornaments.

The next series of specimens are from Dámbe Koh, 40 miles west of Sutkágen Dor. From this place and from other localities in the neighbourhood several very beautifully shaped articles of pottery, evidently intended for holding water, were procured by Major Mockler. These vessels have as a rule small orifices and well formed spouts; sometimes there is a second orifice. Some of the water pots are ornamented with lines and bands, and some small round vessels (fig. 2) have perforated projections at the side, evidently for the purpose of string being attached by which the pots may be suspended. Another very small vessel about five inches long has the form of an amphora (fig. 3). Besides the pottery, copper bracelets (fig. 5), a small copper lamp or ladle (fig. 6), carnelian beads, and stones for sharpening knives are exhibited, all procured from the *dámbs* or tombs of Dámbe Koh, Júni and Gáti.

These form the first series of specimens sent by Major Mockler, and I had intended to exhibit them in April last. I have since received another

* Proceedings for August, 1876, p. 172.

† Proceedings for July, 1875, p. 134.

valuable and interesting collection also exhibited, concerning which I will read a few extracts from a letter of Major Mockler's, dated 20th April, 1877.

"I am now sending you a lot of 'rubbish' picked up on my trip, which you can add to the former lot. I opened several more cairns and found some small differences in the mode of sepulture in each locality, also in the shape of the cairns. In my paper* I described the square and oval types; there is also to the westward a long type, some of the cairns being as much as 50 feet long, but never more than 5 feet in breadth; in these cairns I found for the first time pots which had been exposed to the action of the fire, so that the dead must have been supplied with cooked food. I examined some of these on the Kohistán hill, near Soorag, and in one found a silver bracelet which had been soldered by lead, and copper arrow heads (which I had found at Tank before). * * * The two stones from Chidizi I am most anxious to hear your opinion concerning, I take them to be stone hammers, used for what purpose I do not know, but possibly for breaking hard univalve shell fish. I feel sure that they have no connexion with the round grinding stones found in the towns, of which I have put in a couple of specimens. I should also be much obliged if you could find out and let me know whether the fragments of pottery from Balasar have anything like writing upon them.

"The copper coins from Sádátmand are, I am afraid, undecipherable; this place is on an almost inaccessible hill about 12 miles from Jashk where there are some very beautiful little cave temples hewn out of the solid rock, pillars, some square, some octagonal, &c., being left at intervals. On some of these pillars there are numerous inscriptions in the Hindi character; they are probably Buddhist."

Major Mockler adds copies of some of the inscriptions, which copies I have submitted to Dr. Rájendralála Mitra, who has with his usual kindness endeavoured to decipher them, but without complete success. One inscription he has been able to read, it runs *rúhadaganaśa chaitá* (the grave of Ráhadagana), but of the others only portions are intelligible. Dr. Rájendralála considers these inscriptions probably 800 or 900 years old.

Some of the articles recently sent appear to indicate much the same age as those from Dámá Koh, the date of which was fairly shewn by the occurrence of a Greek coin, but others may be of later date. The remains from Sutkágen Dor, comprising numerous flint knives, appear to be older. Much of the pottery from Balasar and some other places is glazed, and several articles of glass, including the remains of well formed bottles, are included in the specimens from the more western localities.

The marks on the Balasar pottery (fig. 10) look like letters but may be ornament. In one case (fig. 11) they certainly appear purely ornament-

tal. The stone hammers (fig. 12) are very curious, resembling fossil vertebræ. It is difficult to suggest for what purpose they were intended. They are surrounded by a groove, which may have served simply to enable them to be grasped in the hand, or they may have been encircled by a band by which they were fastened in a handle.

All the articles mentioned in Major Mookler's letter are amongst those now exhibited, besides a large number of articles not specified. The whole will be presented to the Indian Museum, Calcutta.

The following are the articles figured in the accompanying plate.

- Fig. 1. Unglazed earthenware cup, from Sutkágen Dor : one-fifth the natural size.
- „ 2. Vase of unglazed earthenware, with perforated projections by which it could be suspended ; from Dámá Koh, found in the ruins of a house : one-fifth the natural size.
- „ 3. Peculiarly shaped vessel of unglazed earthenware, with two perforated projections for suspension ; from Dámá Koh : one-fifth natural size.
- „ 4. Oblately spheroidal vessel, flattened below, of unglazed earthenware, with a small mouth, perhaps intended for carrying water or other liquids on bullocks, asses or mules ; from Júni : one-fifth natural size.
- „ 5. Copper bracelets with snake's head ornament, from Júni : one-fifth.
- „ 6. Copper lamp or ladle, from Júni : one-fifth.
- „ 7. Amphora of green glazed earthenware, from Gáti, 6 miles from Gwádar : one-fifth.
- „ 8. Unglazed earthenware vessel with spout and a handle of twisted cord-like form, beneath the handle is a small air hole ; the vessel is unsymmetrical and differs from all the others figured in this respect ; from Gáti : one-fifth.
- „ 9. Spout of another earthenware jar : one-fifth.
- „ 10, 11. Ornamental markings on glazed pottery from Balasar : one-fifth.
- „ 12. Stone hammer from Chidízi : one-fifth.
- „ 13. Copper arrow-head from Soorag : one-fifth.
- „ 14. Small urn-shaped vessel of green glazed earthenware ; from Girdkoh near Wank : one-fifth.
- „ 15. Flint knife from Sutkágen Dor : full size.

Mr. BALL said—It might perhaps be of interest for him to mention that in a part of Balúchistán, far from the localities where the objects collected by Major Mookler were obtained, he saw a number of mounds containing fragments of ornamental pottery. These mounds were situated in the Khetrán valley near the borders of Afghánistán. The occasion was

in 1874 when, in company with Major Sandeman, he visited the Sulimán region west of Dera Gházi Khán. There was no time for any exploration of the mounds to which their attention had been drawn by the *Khetráns*, who seemed to regard them as being of great antiquity. Certain it is that people of that part of the country, at the present day, neither use nor manufacture any description of pottery.

The CHAIRMAN said that the thanks of the meeting were due to Major Mockler for permitting his collection of antiquities to be exhibited to the meeting. They were highly interesting both from an antiquarian and an ethnological point of view. The study of the social condition of a people from the remains of their utensils, arms, and other domestic articles was of modern date; but it was one which, in the absence of other and more direct evidence, was of great importance, and in connexion with the dwellers of the Lake-habitations of Switzerland, and other ancient people had been very largely utilised. The evidence the articles afforded were also of a character, which none could gainsay, and were thoroughly authentic. For the illustration of the history alike of art and of civilization they were of inestimable value. He was not aware of the exact date of the articles; but accepting the opinion of his learned friend Mr. Blanford, founded upon fairly reliable evidence, that the articles must be about 2000 years old, he thought the fragments of glazed pottery exhibited were particularly interesting. In Arrian's *Periplus of the Erythrean Sea*, mention was made of the celebrated Murrhian cups which were said to have been exported from Bairigaza, modern Broach, but were manufactured in Guzerat and its adjoining provinces; as also in Oojein. Some antiquarians supposed that the cups were made of crystal; but there was no doubt now of their having been of porcelain, and the glazed pottery on the table showed that those who could prepare such excellent glaze, would not find the manufacture of porcelain impossible for them: at least the probability lay in their favour.

The specimens of glass on the table were not particularly good; but it was said that glass was manufactured in India from a remote period of antiquity, and mention of it was met with in many ancient works. The specimens gave a tangible proof of the assertion.

Mr. WOOD-MASON exhibited specimens of new and little known insects collected by Mr. Ossian Limborg and staff in Upper Tenasserim, and read the following preliminary notes upon them:—

ORTHOPTERA.

Fam. PHASMIDÆ.

* Female perfectly apterous; the melanotum proper much longer than the medial segment. A process at the hinder extremity of the sixth ventral segment of the abdomen.

1. *PHIBALOSOMA ACANTHOPUS*, Burm.

Bacteria acanthopus, Burmeister, Handb. d. Entom., 1838, Band II, Abth. 2, S. 565, ♀.

Phibalosoma acanthopus, Westwood, Monograph of Phasmida, 1859, p. 74, ♂ ♀.

A specimen of this species from Tenasserim has a lamellar process (not a spine, as in the type,) bilobed at the extremity, at the hinder end of the sixth ventral segment of the abdomen. It is a gigantic insect, measuring:

Total length 10 in. 1 line; head 6 lines; prothorax 3·75; mesothorax 25·5; metathorax 19; abdomen 4 in. 6·5 lines + 12·5 lines = 5 in. 7 lines; antennæ 2 in. 8 lines; anterior femur 2 in. 8 lines, tibia 8 in. 1 line; intermediate femur 1 in. 11·75 lines, tibia 2 in. 0·75 lines; posterior femur 2 in. 4·5 lines, tibia 2 in. 5 lines.

HAB. From Moolai to Moolat, Upper Tenasserim, 4000—6000 feet ♀ Singapore, ? (Burmeister); and Java ♂ ♀ (De Haan).

2. *PHIBALOSOMA ANNAMALLAYANUM*, n. sp.

♀. Very closely allied to the preceding, from which it differs in its stouter body, in its shorter and thicker legs, and in the relative proportions of the different parts of the body, particularly the meso- and metathorax.

The following are the measurements of a spirit-specimen:—

Total length 8 in. 9 lines; head 7 lines; mesothorax 19; metathorax 16; abdomen 8 in. 6·75 lines + 1 in. 2·5 lines = 4 in. 9·25 lines; antennæ 2 in.; fore femur 2 in. 2 lines, tibia 2 in. 6 lines; intermediate femur 1 in. 8 lines, tibia 1 in. 8 lines; posterior femur 1 in. 11 lines, tibia 2 in. 1 line.

HAB. Annamallay forests, Southern India, a single specimen preserved in spirits, obtained by Colonel R. C. Beddome; Travancore Hills, a much mutilated dried example, presented to me by Mr. F. Day.

3. *PHIBALOSOMA VIRGEEA*, Westwood.

HAB. Sibságar, Assam, etc.

* * Female with minute scale-like rudiments of organs of flight and the metanotum proper equal to the medial segment. *Hinder extremity of sixth ventral segment of the abdomen unarmed.*

4. *PHIBALOSOMA WESTWOODII*, W.-M.

P. Westwoodii, Wood-Mason, J. A. S. B., 1875, Vol. XLIV, p. 216, ♀.

HAB. Samagúting, Nágá Hills, and Nazirah, Assam.

5. *PHIBALOSOMA CANTORI*, Westwood.

P. Cantori, Westwood, Monograph of Phasmida, p. pl. XXXVII, fig. 1, ♂, XXXVIII, fig. 1, ♀.

HAB. Malacca (Dr. T. Cantor).

Obs.—The specimen figured by Westwood as the male of *P. Cantori* may turn out to be that of the preceding species, the head being similarly

furnished with two tubercles of greatly unequal size, not a trace of which is to be seen in its supposed partner.

LONCHODES GODAMA, n. sp.

Very closely allied indeed to *L. verrucifer* (from the Andamans), but differing in its more scabrous body, especially in the male, in having the head armed with a transverse curvilinear ridge of varying development instead of conical horns, in having the supra-anal plate in the female longer than the terminal dorsal abdominal segment, in its greater size, in the structure of the male forceps, etc.

A male and a female measure respectively :—

♂ Total length 4 in. 4 lines; head 1·75 lines; prothorax 1·75; mesothorax 18·25; metathorax 8·75; abdomen 20·75 + 5·5 = 21·25; antennæ 22·25; anterior femur 12·75, tibia 14; intermediate femur 8·75, tibia 10, posterior femur 10, tibia 18 25.

♀ Total length 5 in. 9·5 lines; head 3·25 lines; prothorax 3; mesothorax 16; metathorax 11·25; abdomen 2 in. 5·25 lines + 6 lines + 2·5 lines = 8 in. 1·75 lines; antennæ 2 in.; anterior femur 14 lines, tibia 14, intermediate femur 10·5 lines, tibia 10·5; posterior femur 12 lines, tibia 13.

HAB. Ahsown,* on the Tao Range, Upper Tenasserim, between 2000 and 6000 feet elevation,—abundant.

Obs.—In one specimen of the female the curvilinear ridge between the eyes is enormously developed and the supra-anal plate semioval as in *L. verrucifer* which latter difference seems to be the result of injury received during immaturity.

LONCHODES PORUS, Westwood.

L. porus, Westwood, Monograph of Phasmidæ, 1869, p. 42, pl. VII, fig. 9, ♂.

The female is very similar to those of *L. Bootanicus* and *L. (olim Baucis) Baucis* (confer Wood-Mason in J. A. S. B., 1875, p. 217). The four whitish bodies described by Westwood (with probably nothing but a dried specimen for observation) as metathoracic and mesothoracic tubercles turn out to be very minute rudiments of tegmina and wings, which are represented in the female by small yellow blotches only. Similarly, the tubercles faithfully represented by Westwood in his figure, but not mentioned by him in his description of *Lonchodes virgea*, are rudiments of organs of flight; this species should be removed from the genus *Lonchodes* to its proper place next to *Phib. acanthopus*.

HAB. *L. porus* occurs abundantly throughout the valley of the Houng-da-rau, Upper Tenasserim; many individuals of both sexes in all stages of development having been sent up by Mr. Limborg.

The species forms with *Lopophus Iolas*, *Lonchodes Baucis*, and *Lonchodes Bootanicus*, a series of most closely allied forms showing in a most instructive and conclusive manner the utter valuelessness of the presence or absence of wings as a generic character in this family of orthopteran insects.

BACILLUS HISPIDULUS, var.

Bacillus hispidulus, Wood-Mason, J. A. S. B., 1873, Vol. XLII, p. 47, pl. VII, fig. 2 et 3 ♂ ♀.

Longer and slenderer and with much longer legs than the type specimens from the Andamans. The specimen mentioned on page 48, *loc. supra cit.*, agrees with the males and was probably also from the neighbourhood of Moulmein.

HAB. Abundant throughout the valley of the Houg-da-rau.

Obs.—*B. hispidulus* ♂ is very nearly allied to *B. Soukongia*, Westw., but differs in not having the posterior angles of the penultimate dorsal abdominal segment acuminate, in its feebly forcipated anal cerci, etc.

LEPIDOPTERA.

Fam. MORPHIDÆ.

THAUMANTIS LOUISA, n. sp.

Th. alis supra albis, anticis dimidio basali, posticis partibus duabus basalibus latissime et purissime fulvis; singulis, ut in Th. Howqua, fasciâ submarginali lunularum cum maculis hastatiformibus coalitarum saturatissime violaceo-fusca, ornatis; lunulis maculisque alarum posticarum valdè majoribus: alis infra luteo-fulvis, anticarum parte media sola alba luteo vix tincta; strigis quatuor sinuatis, duabus basalibus saturate brunneis, alterisque duabus submarginalibus obsoletis et tantum ad angulum analem brunneo-coloratis; anticarum ocellis omnibus (5) obsoletis, posticarum autem duobus (intermediis tribus obsoletis) rufis pupilla alba, iride tenui nigra.

Expans. alarum antic. unc. 5 lin. 3.

Habitat in Tenasserim in montibus "Taou" dictis ad alt. 3—4000 ped. O. Limborg detexit.

This fine and distinct species belongs to the same division of the genus as *Th. Camadeva*, *Th. Noumahal*, *Th. Cambodia*, and *Th. Howqua*, to the last of which it is most nearly related, but from which it differs in having the upper surface of the wings white and fulvous instead of fulvous throughout, and in having five spots instead of ocelli on the under-surface of the fore wings and only two well-developed ocelli on the hinder wings, instead of three and five respectively.

DR. RÁJENDRALÁLA MITRA exhibited to the meeting plaster casts of the celebrated Háthigumphá inscription at Udayagiri, and submitted a revised reading and translation of that record. He said, he was indebted to his friend Mr. H. H. Locke of the Calcutta School of Art for the opportunity of reading the record and of exhibiting the casts, which had been prepared under the immediate superintendence of Mr. Locke, at the cost of

General Cunningham, to whom they belonged. They were the most perfect specimens of the kind of work that, under the peculiar circumstances of the case, could be expected. The inscription included seventeen lines of the most ancient Pāli character, and, in language, was closely allied to the edicts of Aśoka. It was recorded on the living rock above the entrance of a large natural cavern extended by art, and covered an area of over 84 square feet; each letter measuring about two inches in length. The entrance was from 5 to 10 feet high, and the monument was recorded on the highest point. The rock was of soft sandstone, and the surface on which the inscription was engraved had suffered greatly from exposure to the weather for the last two thousand two hundred years. The surface was very rough, and in many places had peeled off, causing serious lacunæ in the record. The only access to the record could be had by putting up a scaffolding, and even then the moss on its surface caused serious difficulty in the way of reading it. The surface was so uneven that no estampages could be taken that would be worth the trouble.

The record was first brought to the notice of antiquarians by Mr. Stirling in his essay on Orissa, published in Volume XV of the *Researches*, but so little was known of the ancient Pāli alphabet at the time, that nothing could be made of it. In 1837, Major, (then Lieutenant,) Kittoe, when travelling in search of coal in Orissa, came to the place, and, after great trouble, secured an eye-copy, and from it Prinsep prepared his reading and translation. Speaking of the eye-copy Mr. Prinsep said, "Nothing short of an impression (and from the nature of the rock, an impression was impossible,) could surpass in fidelity Mr. Kittoe's twice compared facsimile," and the praise was well deserved. After a careful comparison of his copy with the cast, Dr. Mitra had found very little in it to take exception to, except in places where the faintness of the engraving or the defective form of the letters had left room for alternative readings. The record had, since Lieutenant Kittoe's time, suffered extensive injury, and many letters, at times eight or ten in one place, which, judging from his facsimile, had been then perfectly clear, were no longer legible.

When Dr. Mitra was at Udayagiri he caused a cast to be taken in plaster of Paris, but by a stupid blunder his assistants forgot to number the different pieces, and so it proved utterly useless. Mr. Locke's cast had been first taken in clay, and from that reversed facsimile casts were made in plaster of Paris. The sections were so taken as to have the last letter of the first section repeated in the one next to it, and the last line of each section was repeated on the section below it, so that even without numbers the sections could not be misplaced. And altogether the work was so done as to be in every way creditable to Mr. Locke's care, diligence, and thorough knowledge of the requirements of the antiquarian.

Mr. Prinsep's translation had been prepared under many disadvantages, and, in concluding what he called his "hurried and imperfect notice," Prinsep deemed it necessary to apologize, for "offering it to the Society in so immature a shape." With the cast before him the speaker therefore thought it advisable to go over the work, and prepare an independent translation, which resulted in many changes and emendations which have materially altered the sense, and given quite a different turn to several salient points of the record, particularly in the first six lines which were in a better state of preservation than the subsequent ones.

The author of the record was one Aira, a usurper, who overthrew the dominion of an ancient king of Kalinga and, himself becoming the sovereign, repaired the city walls, built Chaitiyas, caused a tank to be excavated, entertained the people with feasting and music, allied himself with the king of a neighbouring hill by marrying his daughter, won over the clergy by rich presents, and had some caves excavated for their use. The most important fact mentioned in the record was the overthrow, by this usurper, of king Nanda of Magadha, and this carried him back to the middle of the fourth century before Christ. It was not distinctly stated which of the nine Nandas he overcame in battle; but assuming the potentate meant to be the last of the line, the time would be a few years before the invasion of India by Alexander the Great in 327 B. C., and make the record the oldest yet found in India. Dr. Mitra was of opinion that the caves referred to by Aira were the Queen's Palace and its surrounding caves, and the reasons on which he based this conclusion he had, he said, given at length in the forthcoming volume of his *Antiquities of Orissa*.

There were three monograms on the record. The first of these was very like the Tántric symbol called *Kurmachakra* or the "tortoise symbol." The second looked like a lamp post, but Dr. Mitra took it for the "bo tree" with a railing round its base. The third was partly like *Swastika* and partly the *Nandavarta*, the emblem of the twenty-third Jain, Ara. It was avowedly a Jain emblem; but the Buddhists looked upon it with great veneration, and many of their ancient princes adopted it for the legend of their seals, and impressed it on their coins. In the Tantras of the Hindus it was highly extolled for its mystic virtues. Nor was it confined to India alone, for in its simple form it occurred, according to King's Gnostics, on the oldest Greek coins, on Etruscan vases, on the Newton stone, Aberdeen, on Celtic monuments, and in ecclesiastical sculptures, styled there the Tetragrammaton. Similarly, the Ibis worshippers of Egypt marked with it the sacred vases of their goddess before using them at their rites. It occurred further among the Gnostics; and the Free-Masons had adopted it as one of their mystic symbols. It was the same with the mark recommended to be placed on the forehead of the elect, in Ezekiel, and on the

worshippers of the Persian Mitra. It was likewise a mark placed among the Greeks on the culprits reprieved from death, and affixed on the roll-call of Roman legions against the names of the living. It was the same with the Grammadora, first seen in Greek and Italian pottery (B. C. 700 to 500). In Schliemann's Troy there were several drawings which showed the symbol to have been common enough among the Trojans. It had been also met with on Scandinavian gold ornaments of the Bronze period. A modification of it was the distinctive badge of *Xaca Japonicus*, and the *crux ansata* and the *sistrum* were allied to it. Persons were not wanting who fancied the European coronation orb to be closely related to this mystic cross. Dr. Inman took it to be a Phallic symbol, and Max Muller thought it to be the monogram of man. That it was intimately connected with the pre-Christian cross, none who had studied the history of ancient symbols would for a moment deny.

The following is a copy of his revised translation.

Line 1. Salutation to those who have overcome all human passions
i. e., Arhats; salutation to all who have attained perfection.

By Aira, the great king, who has a mighty elephant for his vehicle, who has lavished his wealth in erecting Chaityas, who is distinguished by the attributes of Śākya, who is renowned for having looted the earth to its outermost limits, who is the sovereign of Kalinga, has this hill been excavated.

Line 2. Having devoted fifteen years to juvenile pastimes, and nine years to the acquisition of (different) forms of writing, arithmetic, civil polity and laws, he, (Aira) wishing to be a king, with a giant's vigour and an endless army, becoming victorious in the third

Line 3. Battle in the capital of the Royal dynasty of Kalinga, receives royal unction.

Devoted to the duty of kings he causes the gates, walls and houses (of the city? or of the palace?) which had been destroyed by the rain and wind, to be repaired.

In the city of Kalinga, a lake (with water) refreshing as the moon-beam and a ghat and many roads for all kinds of equipages, he causes to be

Line 4. Consecrated. He causes the gratification of hundreds of thousands of his subjects whose heads are bent down in salutation.

In the second year (of his reign), reflecting on his interest, he causes to be placed on the west side (strong detachments of) horses, elephants men, war-chariots, and pike-bearers.

For (the gratification of) those who came from Kaśī forest to behold (the rejoicings) as also for that of the inhabitants of the town of Tānasiko, on the following year,

Line 5. He causes to be celebrated an entertainment with the music

of *dampana*, *tabhata* and other musical instruments by persons proficient in the science of music, and a dramatic performance by dancing girls.

Next, in the fourth year, in the house of the learned (he calls together ?) the *Arhats* who had been established by the king of the city of Eastern Kalinga. Impelled by devotion to acts of religion the forsaken umbrellas—a hundred

Line 6. Urns full of jewels, which inimical kings had given up to him, he causes to be offered (to the gods ?).

Now in the fifth year, king Nanda having been by him expelled from home, went away on a swift horse to the city of *Punāli*—

Line 7. He munificently distributes in charity many hundred thousand (*panas*)—a hundred—town, territory—governs well. In the eighth year—his mind—hill—

Line 8. (To) the prince who caused (its) destruction he ordains the pain of the cavern (imprisons in one of the caves ?) and causes the murderer to labour by a generous requital. Seated on the hill,—lavishes bland speeches and (receives ?) obeisance—

Line 9. Apes, bulls, horses, elephants, buffaloes and all requisites for the furniture of the house—to induce the practice of rejecting improper persons, he further bestows (or appoints) attendants of the *baiman* caste (*Brahmana* ?)—

Line 10. The highly renowned king causes to be made the palace of fifteen victories—

Line 11. Finding no glory in the capital which had been the seat of the ancient kings, a city abounding in envy and hypocrisy, and reflecting, in the thirteenth year—the fall of heavenly forms—twelve.

Line 12. For the profuse profit of crowded congregations he established—*Magadha* kings,—well governed—since Nanda *Rājā's* —

Line 13. He distributed much gold at *Benares*,—he gives in charity innumerable and most precious jewels—

Line 14. In the thirteenth year—married the daughter of the so-called conqueror of the mountains (a hill *rājā*)—impelled by virtue of *Arhats*—

Line 15. By him on a hundred sides—before perfected being, and crowds of people—wealth—

Line 16. He causes to be constructed subterranean chambers, caves containing a *Chaitya* temple and pillars—for congregations—king of *Ayama*—kings of *Surasena*—caves.

Line 17. For whom the happy heretics continually pray, having a lakh of equipages—the fearless sovereign of many hills by the sun-cherished the great conqueror of the ocean shore—

The following papers were read :—

1. *On the Metád Rat, with a note on Golunda Elliotti.*—By W. T.

BLANFORD, F. R. S.

(Abstract.)

The genus *Golunda* of Gray was originally proposed for two species; *G. Elliotti*, already described in the Journal last year and *G. metáda*, (the specific name being evidently a misreading or misprint for *mettada*,) the subject of the present notice. This rat is very rare in collections, but Mr. Fairbank of Ahmednagar has, after a considerable amount of trouble, succeeded in obtaining several specimens, and an examination of these shew that the animal has none of the cranial or dental peculiarities of *Golunda Elliotti*, and that there is no reason for removing the metád from the genus *Mus*. A description and figures of the head, skull, teeth, &c., are given. Some measurements of fresh specimens of *G. Elliotti* are added, together with the synonymy of both species.

The paper will be printed in the Journal, Part II.

2. *Description of new Species of Asiatic Shrews in the Indian Museum.*—

By DR. J. ANDERSON.

This paper will be printed in the Journal, Part II.

3. *Notes on certain Mammals occurring in the Basin of the Máhanadi.*—

By V. BALL, M. A., F. G. S.

The following brief notes refer only to those species whose occurrence in the above named area has not been previously recorded, or regarding which any unpublished facts in reference to distribution have come under my notice.

It would not subserve any useful purpose at present to attempt to give a general list of the Mammal fauna, as the larger animals of wide range are well known to inhabit this part of the country and the Micro-Mammalia have only been partially collected.

TUPAIA, ELLIOTTI, Waterhouse.

In the Proceedings for April 1874 I recorded having met with the Madras Tree-Shrew in the Sátputra hills and also that it had been received from Monghyr. Since that time it has been recorded from Matheran by Major Hayes Lloyd and it is mentioned by Dr. Gunther as having been obtained by Capt. Beavan in Mánbhúm.

In 1876 I met with it several times in Sambalpur, not unfrequently it passed me during beats for large game, and on one occasion I picked up a dead specimen which I found early one morning lying at the foot of a tree. Save for a small quantity of blood about the mouth, this specimen shewed

no external sign of injury. On several occasions during the past season (1876-7) I have met with these small animals. They seemed to be most abundant in a large *Sal* forest on the northern boundary of Jaipur (Vizágapatam District). In Karial (Raipur District) as in Sambalpur, I found one dead early one morning last April. It had several wounds on its body which were, I think, most probably, the result of an encounter with an owl or other *raptor*. The testes were largely developed—possibly it may have been killed by another male. The measurements of this specimen were ♂ Length of body 6"5; tail 7"5 = 14".

FELIS JURATA, Schre.

The sole evidence that I have of the occurrence of the hunting leopard is the fact that I saw a skin of one which was brought to the Sambalpur treasury for the Government reward. Unfortunately at the time I saw it it was not possible to trace the history of this skin, but it was in so good a condition that it did not seem probable to me that it had been brought by a native traveller from a long distance.

I may add that on one occasion in Rairakhol I got a brief glance at a leopard in the jungle which, from its light colour and erect carriage, I thought might possibly belong to this species.

Quite recently I have received information from Mr. F. C. Berry, ('S.), of a melanoid specimen of *F. pardus* (*F. Melas*, Perron), having been shot in Sambalpur.

PTEROMYS ORAL, Tickell, *P. Petaurista*, Pallas *apud* Jerdon.

Although the brown Flying Squirrel is known to occur in the forests of Chota Nagpur and the Central Provinces I have, on account of its nocturnal habits, only once actually seen it. The occasion was one evening last April when after sunset I saw what I took to be the ordinary large red squirrel laboriously clambering up to the topmost branches of a large tree. Calling for my gun it was put into my hands just as the true nature of the animal was declared by its soaring off towards some bushes. On my shooting it the people expressed much astonishment and the Itaja of Karial, near whose house I shot it, declared he had never heard of such a 'bird' before.

Karial adjoins Bastar where this species was observed by Dr. Jerdon. Mr. Blanford, I believe, obtained it near the Godávri and recently I have heard of its having been shot on Parasnáth Hill.

The colours of the Karial specimen when quite fresh were as follows :—I give them as there appears to be some difference of opinion as to the true coloration.

♂ *Above.* The hairs black, tipped with grey giving a general hoary appearance. Feet and prolonged toe which supports the parachute—black.

Tail smoky-black. *Beneath.* Greyish-white passing into smoky-grey on the cheeks extremities and edges of the parachute. This specimen does not shew the rufous patch noted by Dr. Jerdon as characteristic of the male.

Unfortunately the specimen was not measured in the flesh. After stuffing and partial drying its dimensions (unstretched) were—

Length $15\frac{1}{2}$ + tail $15'' = 30\frac{1}{2}$

Extent between fore feet to end of claws $16\frac{1}{2}$

" " hind " " " $17''$

Width of parachute across centre of body $12''$

SCIURUS MAXIMUS, Schre.

This squirrel probably occurs sparingly throughout the area, but in some places is particularly abundant, as in Athgar near Cuttack where it is to be found in certain ancient Mango groves on the banks of the Mahanadi. I have shot it in Rairakhol and in Daspalla on the south of the Mahanadi. At Paparhandi in Jaipur I heard of a large colony but did not visit the locality. Dr. Jerdon found it to be abundant in Bastar.

• ELEPHAS INDICUS, Cuv.

The elephant within our area, so far as I know, does not occur south of the Mahanadi. Possibly there may be some in the Khond Malias of the Orissa states but I have never heard of them and I received positive information that there were none in Kalahandi. Far to the south indeed, in Bastar, a party of five have for many years been wandering about, but it is stated that these, or at least a pair of them, originally escaped, and the last of the herd, a remarkably fine male, which has this year been captured by the Bastar Raja is claimed by the Jaipur Chief as having formerly belonged to him and is at the present moment the subject of a very complicated dispute. North of the Mahanadi, elephants occur in Hindol, Dhenkánál, Keonjhar and Mohurbhanj. Outside our limits they are found in the long range of hills which separates Mámbhúm from Singhbhúm.

In the extreme west of Chota Nagpur in Korea and towards Matin and Uprora there are colonies also. In all the above localities the Kedda operations of the last ten years have much diminished the numbers—in some cases I believe no individuals of the herds have escaped.*

RHINOCEROS SONDAICUS, S. Müll.

According to Dr. Jerdon "a very few individuals (of this species) are stated to occur in the forest tract along the Mahanadi river, and extending northwards to Midnapore."

* In the Proceedings for May 1868 I have given a list of the trees upon the leaves of which the elephants of these jungles chiefly subsist.

So far as I have been able to ascertain there is no authentic case of a Rhinoceros ever having been observed in the forest region bordering the Máhanadi. It has occurred to me as possible that the rumour may have got abroad from the fact of there having formerly been tame specimens in the possession of some of the Rajas.

At Burpali in the Dakin-tir of Sambalpur the Raja told me that on the occasion of a marriage between a daughter of one of his ancestors and the Bamra Raja, the bride's dowry had been a Rhinoceros, which before that had for some years been kept at Barpali.

In Patna (Sambalpur) I met with an old Cabuli who had retired from his former business as a trader. He told me that one of his speculations was a Rhinoceros which he purchased in Calcutta and marched down offering it for sale to various Rajas *en route* till he reached Jaipur, where he disposed of it for Rs. 11,000 which sum, however, he said, he never received.

It is perhaps unnecessary to state that it is unadvisable to believe all that one hears from the people at the head quarters of these states though the lower classes of the population may be truthful enough. But I shall mention one example of an untruthful statement. A friend of mine showed me a live specimen of a Cockatoo which he had received from one of these Rajas who assured him it had been caught in his own district. My friend, whose ornithological knowledge was limited, was expecting a further supply of the birds which the Raja promised to have captured for him during the rains when, according to their annual custom, they visited his jungles.

In conclusion I do not know of any cover or grazing grounds in the vicinity of the Máhanadi between Cuttack and Sambalpur suitable for a Rhinoceros. The bed of the river is either rocky or sandy, and marshy *jheels* occur but seldom in its neighbourhood and are then, in all cases, of small extent.

AXIS PORCINUS, Linn.

During the present year, in the Jaipur District, I saw a single specimen of the Hog-deer. I had a good view of it as, owing to its horns, being in velvet, it had come out to the edge of the jungle to feed in the day time. The species must, I think, be rare as I understood from Capt. Blaxland, the Assistant Agent, that he had never either seen or heard of it. A large collection of horns brought in by the natives did not include any of this species. In Chota Nagpur I do not know of its occurrence.

ANTILOPE CERVICAPRA, Pallas.

The Antelope is very sparingly distributed throughout this area. At Barwa in Palamow near the sources of the Sunk and Koel rivers there is a large herd and further west, in Sirguja, outside the present limits, I have met with several distinct colonies. But to the south of the Máhanadi I

only know of three localities where they exist at present. One is on the borders of Kalahandi and Ganjam where I have heard that they are somewhat abundant. The second locality is near Dulapur on the Ong river in the Dakin-tir of Sambalpur where there is a very small herd. The third locality is 150 miles further south near Omerkote on the Jaipur plateau where also the herd is but a small one. According to Colonel Tickell there were a few formerly in the open parts of Singhbhúm. These have now, I believe, been wholly exterminated.

Gazella Bennettii does not occur so, far as I know, in this area, but I have seen it in the extreme west of Sirgúja, whence probably it extends steadily to the Sátpuras where it is not uncommon.

Mr. W. T. BLANFORD said, that he had heard the same explanation as that furnished by Mr. Ball for the asserted occurrence of rhinoceros wild in the Máhanadi country, and he agreed with Mr. Ball in believing that no wild rhinoceros had been found in that part of India in recent times.

LIBRARY.

The following additions have been made to the Library since the Meeting held in June last.

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No. 112. J. A. Harvie Brown.—On the Distribution of Birds in North Russia, 1. On the distribution of Birds on the lower Petchora in north-east Russia. E. A. Smith.—Description of a new Form of *Ophiurida* from New Zealand. J. Wood-Mason.—The *Fates Ashmoleianus* of Westwood, the type of a new Genus of *Mantidæ*. H. N. Moseley.—Hermaphroditism in the Parasitic Isopoda. Further remarks on Mr. Bullar's papers on the above subject. A. G. Butler.—Descriptions of three Homopterous Insects in the Collection of the British Museum. J. G. Jeffreys.—New and peculiar Mollusca of the *Eulimidæ* and other families of Gastropoda, as well as of the Pteropoda, procured in the "Valorous" Expedition. Dr. G. C. Wallich.—Observations on the *Coccothophora*. M. Bayley.—On *Anguillula intestinalis*, a new Nematoid Worm found by Dr. Normand in subjects attacked by Diarrhoea of Cochinchina. O. Galeb and P. Pourquier.—On *Filaria homatica*. M. H. Fol.—On the Intimate Phenomena of Fecundation. R. E. C. Stearns.—On the Vitality of certain Land Mollusks.

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- No. 171. *J. G. Barker* and *S. Le M. Moore*.—Descriptive Notes on a few of Hildebrandt's East African plants. *G. S. Boulger*.—On the Classification of Monocotyledons.
- No. 172. *W. P. Hiern*.—Third Notes on *Ebnacca*; with Description of a new Species.
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- No. 1277. *Wm. Taylor*.—Thaumato-dendra, or the Wonders of Trees.
- No. 1278. *Dr. A. Carpenter*.—The Practical Experience of the Dry system shown by the use of Moser's Closets, in a small district for two and a quarter years. *O. E. Davis*.—A New Process for the production of Carbonate and Caustic Soda, without the formation of any noxious waste and the recovery of the Sulphur.
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- No. 70. *Prof. H. W. L. Turner*.—Cylinders, Cones, and Developable Surfaces. *J. W. L. Glaisher*.—Transformations of some Definite integrals.
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- No. 74. *J. B. James*.—Principles of Compensation in Chronometers. *Ass. Gray*.—Notice of Darwin on the Effects of Cross and Self-Fertilization in the Vegetable Kingdom.
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- No. 20. *M. J. Guérin*.—Troisième mémoire sur l'origine et la nature de la fièvre typhoïde. *M. Tachini*.—Sur les taches solaires. *M. E. Guignet*.—Transformation directe du travail mécanique en électricité. *M. Gayat*.—Sur la conjonctivite granuleuse en Égypte; résumé d'une suite d'observations relatives aux ophtalmies du nord de l'Afrique.
- No. 21. *M. P. Bert*.—De l'emploi de l'oxygène à haute tension comme procédé d'investigation physiologique des venins et des virus. *M. Langley*.—Nouvelle méthode spectroscopique. *M. G. Hayem*.—Des caractères anatomiques du sang chez le nouveau-né pendant les premiers jours de la vie.
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BOOKS PURCHASED.

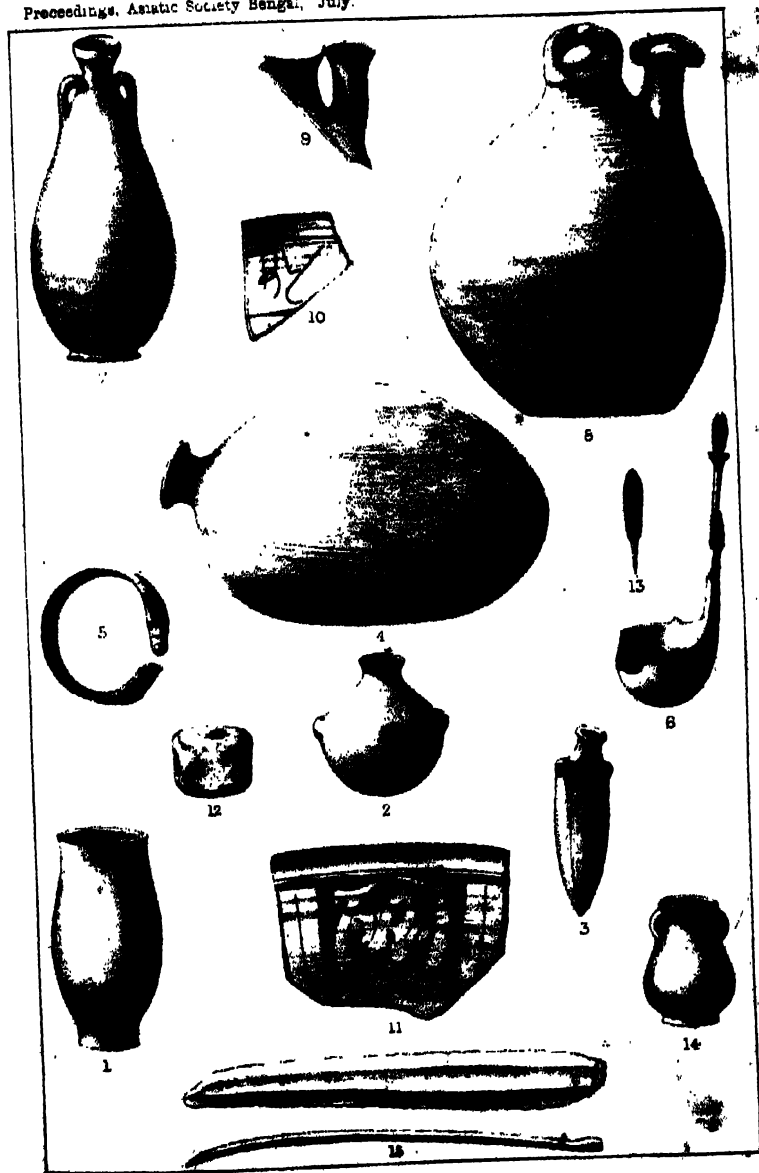
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ANCIENT POTTERY, &c., FROM BALUCHISTAN.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR AUGUST, 1877.

The Monthly General Meeting of the Asiatic Society was held on Wednesday, the 1st August, 1877, at 9 o'clock P. M.

RAI RAJENDRALALA MITRA, BAHÁDÚR, LL. D., Vice-President, in the Chair.

The minutes of the last Meeting were read and confirmed.

The following presentations were announced :—

1. From the Author, a copy of his Report on the preparations for, and observations of, the Transit of Venus, as seen at Roorkee and Lahore, on December 8th, 1874. By Colonel J. F. Tennant, R. E., F. R. S.

2. From the Author, a copy of his work, *The Lord's Prayer translated into the Bôjingtjida; or South Andaman (Etákâbêada) Language*, by E. H. Man.

The following gentlemen, duly proposed and seconded at the last Meeting, were balloted for and elected ordinary Members—

Dr. S. T. Peters.

J. C. Reeves, Esq.

Bábu Mahara Chandra Vrata.

The following are candidates for ballot at the next Meeting—

Bábu Pratápanáráyana Sifha, Deputy Magistrate, Jehánabád, proposed by Bábu Pratápachandra Ghosha, seconded by H. Blochmann, Esq.

Bábu Jnánendrachandra Ghosha, Calcutta, proposed by Bábu Pratápachandra Ghosha, seconded by H. Blochmann, Esq.

Bábu Kedaránátha Datta, proposed by Bábu Pratápachandra Ghosha, seconded by H. Blochmann, Esq.

Captain H. W. Clarke, R. E., Calcutta, proposed by Captain J. Waterhouse, seconded by H. Blochmann, Esq.

W. Duff Bruce, Esq., and Colonel A. D. Vanrenen have intimated their desire to withdraw from the Society.

The SECRETARY reported to the Meeting that Mr. J. D. Tremlett had compounded for his future subscriptions on payment of Rs. 140 after 16 years' Membership.

The CHAIRMAN read the following letter from Dr. H. Oldenburg of Berlin relating to a new edition of the *Vinayapīṭakam*, and stated that the Council had agreed to subscribe for two copies.

"I desire to lay before the Asiatic Society of Bengal the following prospectus of an edition of the *Vinayapīṭakam*.

"A chief difficulty in the investigation of the origin and early history of Indian Buddhism results from the fact, that the principal works of Buddhism have not yet been published, or are published only in short extracts and fragments. It is my opinion, that the *Vinayapīṭakam* in the Pāli recension (comprehending the five works *Pārājikam*, *Pācittiyaṃ*, *Mahāvagga*, *Cūlavagga* and *Parivāra*) holds the first place among those works which deserve our attention from an historical point of view. The critical investigation of the life of Gautama Buddha, which has lately been undertaken by M. Senart, will then only have a firm foundation, when it is possible to compare the data of the *Mahāvagga* on the one hand and those of the *Suttas* on the other with those of the northern Buddhists, and so to follow the gradual growth of the Buddha legend. In the same manner it must be of the highest importance to compare the principles of Gautama's teaching in the form they assume in the *Suttas* with the form preserved in the *Mahāvagga*. The *Pārājikam* and the other works relating to ecclesiastical matters will be of great service in the investigation of the historical credibility of the Mahāvāṇsa and the Dīpavāṇsa chronicles. The data there given regarding the Councils and Schisms of the first centuries of Buddhism will receive support or correction from these writings; and the result of this comparison cannot fail to throw some light on the much debated question of the difference between the Northern and the Southern accounts of the councils. Finally it must be interesting to compare the legislative contents of the *Vinayapīṭakam* from Magadha with the corresponding and nearly contemporaneous data from Brahmanical sources in the literature of the Vedic Sūtras from the more westerly Aryavarta. Without doubt new conclusions will result from this comparative study, and such a study is impossible till the text of the *Vinayapīṭakam* is accessible in a published form.

"I intend to publish the *Vinayapīṭakam* giving the Pāli text in English letters without adding anything else but a selection from the various readings, which arise from the differences of the Sinhalese and the Burmese MSS.,

and an index. The Pāli collections of the London and Paris libraries suffice for constituting my text. Any notes that may be deemed necessary, will be in English. The work will consist of 5 volumes of together 1900 to 2000 pages, taking as a model the size of Childer's edition of the *Mahāpari-nibbānasuttam* in the Journal of the Royal Asiatic Society for Great Britain and Ireland. The printing expenses will amount to about £000. Messrs. Williams and Norgate, (Henrietta Street, London) have consented to undertake the publishing, if the greater part of this sum can be covered by subventions or subscriptions. The price of a copy will be £3. If the sufficient part of the expenses can be covered, the first volume will be published probably at the middle of next year, and the whole work will be finished after three or four years.

"I venture to appeal to the Society, which has already done so much to encourage Oriental learning, to afford me such assistance as they shall think that the present undertaking may deserve."

Dr. RĀJENDRALĀLA MITRA submitted a copy of the first part of a descriptive Catalogue of Sanskrit MSS. in the Society's Library, prepared under his superintendence and edited by him. It contained full notices of all the works on Sanskrit grammar belonging to the Society. In submitting it, he desired to call the special attention of the members to the MS. treasures of the Society. To those, he said, who were familiar with the great national libraries of Europe, the Society's Library cannot but appear poor. Instead of lacs, it comprised only from 15 to 20 thousand volumes, and almost every branch of the library was more or less deficient. The books, however, had been very carefully selected, and, in connexion with oriental studies, there was very little of real value that was not available to the members. The library, however, was particularly rich in MSS. Of Arabic works there were 1816 codices, of Persian 1549, and of Urdu 399, making a total of 3264. The collection of Pāli and Burmese MSS. included nearly five hundred palm-leaf records. Of old Tibetan xylographs, which were quite as valuable and scarce as MSS., there were upwards of 2000 separate works, and the Chinese collection included ~~newly~~ four hundred ancient texts. There was then a collection of 3,700 Sanskrit codices, making altogether a total, the like of which could not be had in any other public or quasi-public library in India. Some of the MSS. were very old and remarkably correct; a few were positively unique. The value of the collection was, however, as regards the members very much impaired by the absence of good catalogues. There were nominal lists, but they were extremely troublesome to consult, and even such lists did not exist of all the MSS. Attempts had been made from time to time to supply better helps, but owing to some cause or other they had to be given up. As regards the Sanskrit codices, Dr. Mitra

was glad to observe that considerable advance had been made. Notices of nearly 1200 MSS. had been prepared in Sanskrit, and, if some of those members who took an interest in the ancient classics of India, would turn their attention to the subject, and superintend the translation and publication of those notices, the work, the first part of which he had the honor to submit to the meeting, could be brought to an early completion. He was glad also to announce that he had on hand an analysis of the very valuable Sanskrit Buddhist MSS. which had been brought from Nepal by their distinguished associate Mr. B. H. Hodgson, and four forms of the work were already in type.

The following papers were read :—

1. *A theoretical deduction of the best Resistance of a Telegraph Receiving Instrument.*—By R. S. BROUGH.

The information given in the text-books regarding the proper resistance of an electro-magnetic receiving instrument to employ on any Telegraphic circuit is meagre and indefinite. The authors usually content themselves with saying that on short circuits the instruments should be wound with thick wire, while on long circuits they should be wound with fine wire.

Professor Fleeming Jenkin in his "Electricity and Magnetism", however, states that the resistance of the receiving instrument should not be more than a moderate fraction of the resistance of the whole circuit. In a foot note he adds that some authority (un-named) recommends that the resistance of the receiving instrument should be $\frac{1}{4}$ of that of the whole circuit, and remarks that this appears to be a very large value.

Mr. Schwendler in his "Testing Instructions", published under the authority of the Director General of Telegraphs in India, taking into consideration the influence of want of perfect insulation of the line wire, deduces that the resistance of the receiving instrument should be $\frac{1}{4}$ of that of the line wire.

The fact of the matter is that on comparatively short lines, and at low speeds of signalling (say 12 words per minute) the resistance of the receiving instrument is not of much importance, as deficiency of sensibility can be compensated by increased battery power, and the circuit will appear to work equally satisfactorily whether the resistance of the receiving instrument be 500 or 2500 ohms.

In such cases the general rule given in the Text Books is sufficient for practical purposes.

When we come, however, to the case of high-speed signalling,* or

* For high-speed Telegraphy, electro-magnetic receivers are being superseded by electro-chemical receivers, which are free from mechanical and magnetical inertia.

of very long and highly insulated lines, the question assumes a different phase and becomes one of great importance.

Now the best resistance for an electromagnet to be employed as a receiving instrument on any line has to be considered from two aspects, which may fitly be referred to as the "static" and the "kinetic."

Considered under the first aspect the problem is a purely statical one! it is to find the resistance of the receiving instrument, which will make its magnetic force a maximum, when a steady current is flowing from the sending to the receiving station. By a steady current is meant one which does not vary in strength with respect to time. This problem is completely solved and thoroughly understood.

It can be shewn* that the magnetic force is a maximum for

$$r = \sqrt{ki} \left\{ \frac{\begin{matrix} -2l\sqrt{\frac{k}{i}} & -2l\sqrt{\frac{k}{i}} \\ \sqrt{ki}(1-\epsilon) & +f(1+\epsilon) \end{matrix}}{\begin{matrix} -2l\sqrt{\frac{k}{i}} & -2l\sqrt{\frac{k}{i}} \\ \sqrt{ki}(1+\epsilon) & +f(1-\epsilon) \end{matrix}} \right\}$$

Where r = resistance of receiving instrument.

f = " " battery.

k † = " " conduction per unit of length.

i † = " " insulation " " " "

and l = length " line.

If the resistance f of the battery may be neglected,

$$r = \sqrt{ki} \frac{\begin{matrix} -2l\sqrt{\frac{k}{i}} \\ 1-\epsilon \end{matrix}}{1+\epsilon} - 2l\sqrt{\frac{k}{i}}$$

= measured resistance of line with its distant end to earth.

* Blavier, Annales Télégraphiques, 1858, p. 234.

† Let A = measured insulation of line: distant end insulated.

And B = " conduction, " : " " to earth.

Then $k = \frac{\sqrt{AB}}{2l} \log_e \frac{\sqrt{A} + \sqrt{B}}{\sqrt{A} - \sqrt{B}}$

And $i = \frac{AB}{k}$.

From this value of r a considerable reduction has to be made, on account of the thickness of the insulating covering of the wire in the receiving instrument, according to the formula:*

$$\frac{\text{Resistance of receiving instrument}}{\text{External resistance}} = \frac{\text{Diameter of bare wire}}{\text{Diameter of covered wire}}$$

Considered under the second aspect the problem is a kinetic one. Here the current is not assumed to be steady; but the influence of the resistance of the receiving instrument on the rapidity of the variation of the potential of the line is considered, that is to say, its influence on the speed of signalling, since signalling is simply causing the potential at the receiving end of the line to vary in some preconcerted manner. This problem has never been completely solved.

Sir William Thomson, however, has shewn that when the resistance of the receiving instrument is not very great as compared with the resistance of a perfectly insulated line, its effect is the same on the speed of signalling as if the line had been lengthened by a piece whose resistance would be equal to that of the receiving instrument.

Sir William Thomson has further shown that the speed of signalling on any line depends on the value for that line of a certain constant, which may be called the "retardation characteristic" of the line, and the expression for which is

$$RC = \frac{k c l^2}{\pi^2} \log_e \left(\frac{4}{3} \right)$$

where k is the resistance and c the capacity of the line per mile, and l is the length of the line in miles.

Now we see that the value of the RC increases as the square of the length of the line, and since by increasing the resistance of the receiving instrument we virtually increase the length of the line, it is perfectly obvious that if we make the resistance of the receiving instrument unduly high we may increase the value of the RC to such an extent as to impair the signalling speed of the line.

It thus becomes clear that in the case of a very long and highly insulated line the best resistance for the receiving instrument, as indicated by the result obtained by examining the problem under the first aspect only, may be so great as to retard the speed of signalling.

I shall here consider only the case of a perfectly insulated line.

Let l = the length of the line in miles

k = resistance per mile in ohms (supposed uniform)

c = capacity per mile in farads (ditto)

and r = the resistance in ohms of the receiving instrument.

* See Proceedings, Asiatic Society of Bengal, June, 1877.

Then the sensibility of the receiving instrument is :

$$M = \text{Const.} \times \frac{\sqrt{r}}{r + k l}$$

And assuming that the intercalation of the receiving instrument of resistance r in circuit has approximately the same influence on the signalling speed as increasing the length of the line by $\frac{r}{k}$ miles, we have

$$RC = \text{Const.} \times \frac{k c \left(l + \frac{r}{k} \right)^2}{\pi^2} \log_e \left(\frac{4}{3} \right)$$

Now, if it may be assumed that the efficiency of the receiving instrument varies directly as its sensibility, but inversely as its retardative influence, then we have the following expression for the efficiency, namely :

$$\begin{aligned} RE &= \text{Const.} \times \frac{\pi^2 \sqrt{r}}{k c \left(l + \frac{r}{k} \right)^2 (r + k l) \log_e \left(\frac{4}{3} \right)} \\ &= \text{Const.} \times \frac{\sqrt{r}}{(r + k l)^2} \end{aligned}$$

which is a maximum for

$$r = \frac{k l}{5}$$

that is, the resistance of the receiving instrument in the case of a perfectly insulated and uniform line should be one-fifth of the resistance of the line.*

Taking into consideration the resistance of the signalling battery, which has hitherto been neglected, the result is modified as follows.

Suppose we are given a certain number of cells (all of equal electromotive force and resistance) and arrange them so that the total resistance of the battery = f , then it may easily be shewn that the total electromotive force of the battery will be proportional to \sqrt{f}

Thus the expression for the sensibility of the receiving instrument becomes (employing the same notation as before)

$$M = \text{Const.} \times \frac{\sqrt{f r}}{f + r + k l}$$

and the expression for the retardation characteristic becomes

$$RC = \text{Const.} \times \frac{k c \left(l + \frac{f + r}{k} \right)^2}{\pi^2} \log_e \left(\frac{4}{3} \right)$$

and finally, the expression for the receiving efficiency of the instrument becomes,

* Singularly enough, this is the precise value selected, on experimental grounds, by Prof. Hughes.

$$RE = \text{Const.} \times \frac{\sqrt{fr}}{(f+r+kl)^2}$$

which has a maximum both with respect to f and to r , namely, for :—

$$\left. \begin{aligned} r &= \frac{1}{2} (f + kl) \\ f &= \frac{1}{2} (r + kl) \end{aligned} \right\}$$

These maxima conditions are simultaneously fulfilled by :—

$$r = f = \frac{1}{2} kl.$$

2. *Notes on the Mammalian Fauna of the Wardwán and Upper Chenáb Valleys*.—By R. LYDEKKER, B. A., *Geological Survey of India*.

(Abstract.)

In this paper notes are given of several mammals inhabiting the Wardwán and Upper Chenáb valleys, south-east of Kashmir. The list is imperfect as scarcely any micro-mammalia, and no bats are mentioned. The following is a list of the species noticed, or the existence of which within the region has been ascertained : *Macacus rhesus*, *Semnopithecus schistaceus*, *Felis pardus*, *F. uncia*, *Ursus isabellinus*, *U. Tibetanus*, *Canis (vulpes) montanus*, and another large dark-coloured fox, resembling the dark variety of *C. leucopus*, a weasel not identified, but possibly *Mustela kathiah*, *Arotomys Himalayanus*, *Lagomys Roylei*, *Pteromys inornatus*, *Moschus moschiferus*, *Hemitragus jemlaicus*, *Nemorhædus goral*, *Capra sibirica*, *Sus indicus*. A tiger is said to have been killed in the Wardwán valley, and *Cervus Oashmerianus* is occasionally found on the Kashmir side of the river, but it does not cross to the opposite bank.

Of the animals named, four species, *vis.*, *Felis uncia*, *Canis montanus*, *Arotomys Himalayanus*, and *Capra sibirica* belong to the Tibetan fauna.

Mr. W. T. BLANFORD said—it was very important to have accurate lists of animals inhabiting various localities, as it was impossible to determine questions of distribution without a better knowledge of the range of species than we now possess. Such lists are peculiarly interesting when, as in the present case, they refer to a locality on the limits of two different great regions ; the Wardwán and Chenáb valleys being on the confines of the Tibetan province, belonging to the Palearctic region, and of the Himalayan province, the fauna of which is Oriental.

The large fox mentioned by Mr. Lydekker can scarcely be *V. leucopus*, which is smaller than *V. montanus*. It is more probably the large form of *montanus* found in Tibet and Turkestan, and apparently identical with *V. flavescens*, Gray.

3. *Notes of a pre-historic Burial-place with cruciform Monoliths near Mungapet in the Nizam's Dominions.*—By W. KING, Deputy Superintendent Geological Survey of India.

(Abstract)

After details of locality, and supposition of possibly previous observation and description, the paper gives an account of an assemblage of about 150 kists encircled by stone rings, with 4 large stone monoliths in the form of crosses.

The kists and crosses are all of dressed stone, the former being of a much higher style of building than is usually seen in the other ring-surrounded kists of S. India which are commonly called Korumbar Rings.

The cruciform monoliths are distinguishable from other crosses of pre-Christian type, by the different size of the limbs, and by the curved junction between the lower limb and the arms. The largest cross is 18 feet long. One of the crosses is still standing in an upright position, with the lower limb buried about 6 feet in the ground.

The tombs consist of four upright slabs, with a covering lid: the entrance being at one side of the wall facing the sun. Inside, there is a floor slab which is hollowed out in one or more cavities or coffin-like receptacles, an arrangement which is quite different to that of the so-called Korumbar rings which usually contain urns either for the bodies in a packed position, or ashes.

The author supposes that in the present example, the bodies were embalmed.

The principal tomb is 9' 6" long by 9' wide, with a covering slab, 14' 8" by 11' 6," and 1' 4" thick at the edge; the whole height being 5 feet. It contains two coffin-like receptacles, with room for a third. The circle of stones enclosing this tomb is 37 feet in diameter.

The several parts of the tombs are each of one stone.

The stone used is that of the locality, a sandstone; and in this the present tombs differ from the ruder Korumbar rings which are usually built of stone fetched from a distance.

Other, but poorer, assemblages of tombs and without crosses, occur on the slopes of the low hills in the neighbouring country.

These relics are without any inscriptions, or incised characters.

The author supposes that this burial-place is of pre-Aryan age, or rather of the Hindo-Kolarian times. This is about the same age as Colonel Glasford (who had previously written of other megalithic remains in the neighbouring country) attributes to the relics observed by him, and which he calls Indo-Scythic.

This surmise as to the age rests on the fact that similar, though ruder, remains of the same style (the crosses excepted) occur all over the country,

and northwards into the proper country of the Kolarians who now in Chutia Nagpur still build and use tombs of a like kind; and the more improved style of the Rákshasgúdium tombs is attributed to the highest phase in civilization of the pre-Aryan people, who possibly dwelt here and were absorbed by or amalgamated with the Aryan conquerors.

The supposition of a possibly early Christian origin is met by the non-occurrence of other traces of the cross in the outlying country.

The CHAIRMAN remarked that it was usual to associate with pre-Christian and non-Christian crosses a religious signification. Most writers took them to be mystic symbols, and Mr. Inman and others believed them to be of phallic origin. That in some cases there were religious, or mystic, ideas associated with the cross could not be denied, but he thought it would be unwarrantable to suppose that all crosses were connected with religion. Rude stone crosses of other than Christian origin were met with mostly near cairns, cromlechs and other memorials of the dead, and their object was to attract attention to the grave near which they were placed. For this purpose a rough-hewn shaft, such as could be most easily prepared, would scarcely be distinctive enough; it would be somewhat better than an amorphous one, but it would often pass quite unnoticed. An upright post with a cross bar, or, what would be the same thing, a cross-shaped block, on the other hand, though requiring no great effort of ingenuity to execute, could not fail to attract the attention of the rude primitive people for whom, and by whom, they were set up. Such a sign-post in course of time and frequent usage, would become the usual symbol for a grave. It was the simplest and at the same time the most effective, and so it got a wide currency without any religious or mystic idea being associated with it.

Mr. BALL said that on one occasion, eleven years ago, when in company with Dr. Oldham and Mr. Hughes he remembered to have seen an ancient stone cross in the Hazáribágh district. The precise locality was at Basatpur near Leiyo in the valley of the Bokáro river. He regretted that he possessed no record of the character of the cross; but he had a note to the effect that there were at the same place a number of dressed memorial stones, with a truncate-pyramidal shape, which were marked with series of graves that may possibly have had some signification. All of these, like the rude slabs which are put up in parts of Chutiá Nágpur even to the present day, were said to have been the work of Kols.

He hoped this record might be the means of having these remains revisited and properly described. At the time he saw them, he did not attach a proper degree of importance to them, though he remembered that they reminded him of some Celtic remains with which he was familiar.

Mr. W. T. BLANFORD said, he greatly regretted that when in the country to which Mr. King's notes refer, he did not take the opportunity

of visiting the very singular remains described, although he heard of them from Captain Glasfurd, Mr. Vanstavern and others. Despite the very high authority of Mr. Fergusson, he could but agree with Mr. King and the Chairman in thinking it questionable whether the crosses in the Godávri valley have any connection with Christianity. There are two circumstances which should, he thought, be taken into consideration before admitting the Christian origin of these monoliths.

The first has been already noticed by Mr. King; it is the absence of any inscription, of any distinctive sculpture, or of any Christian symbol except the cross. Now a people who were sufficiently civilized to carve and transport monoliths of this size, must, if they were Christians, have been acquainted with the art of writing, and it is inconceivable that they should not have engraved some memorial of the purpose for which the stones were erected.

The second reason is the association of the crosses with cromlechs and stone circles. In the Proceedings of the Society for 1868, besides Mr. Mulheran's description of the crosses and cromlechs on the Godávri, at pp. 116 and 148, there are several notices of cromlechs or kistvaens in Coorg and other parts of India, pp. 151, 184, 248. But no one appears to have called attention to the very remarkable explorations of kistvaens and stone circles in the Southern Marátha country by Captain Meadows Taylor. The details of these explorations were published in the Journal of the Bombay Branch of the Royal Asiatic Society in two papers, one entitled "Ancient Remains at the village of Jimarji near Ferozabad on the Bhima," (Vol. III, Pt. 2, p. 179); the other, "Notices of Cromlechs, Cairns and other ancient Scythe-Druidical remains in the principality of Sorapur", (Vol. IV, p. 380.) In some of the circles stone kists were found containing human skeletons, and, together with the perfect skeletons, were skulls detached from the bodies to which they had belonged, in a manner which appeared to prove that human victims had been sacrificed at the funerals of chiefs. In the kistvaens were found urns with bones which had been subjected to the action of fire.

Now it is not likely that any Christian people either sacrificed slaves or concubines at the tombs of their Chiefs, or that they burned bodies. Is it probable that, after they became Christian, they would so far have preserved their former funeral rites as to bury their dead in cromlechs, or to mark their graves with stone circles? It is of course possible that the crosses may be of later date than the cromlechs, but all observers appear to think the contrary.

4. *Note on two Copper-plate Grants of the Chandel Dynasty of the eleventh and twelfth centuries of the Samvat Era.*—By PANDIT PRANNATH SARASWATI, M.A., B.L.

(Abstract.)

These two copper-plate grants are of the *Chandel* dynasty, dated Samvat 1055 and 1107, corresponding to the years 998 and 1050 of the Christian era. The Society was indebted for these copper-plates to V. A. Smith, Esq., B. A., B. C. S., who sent the following account of their discovery :

"In 1872 a peasant when ploughing in the lands of Mauza Nanyaurá, Parganá Panwári, Zila Hamírpúr turned up two inscribed copper-plates. The plates were brought to Mr. W. Martin, C. S., who is now on furlough, and were left by him in the hands of a local pundit [Muralidhar of Maudahá, in Hamírpur Zilá] who was in his service. With the assistance of this man I have had Nágrí transcripts prepared, and have made translations of the inscriptions." The first of these, records the grant of certain lands by Sri Dhanga Deva, the Lord of Kálinjara, the son of Yasovarmma and the grandson of Sri Harsha ; the recipient of this gift (which was made at Benares on the occasion of an eclipse of the Moon) is mentioned as one Rudra Sri Yasodhara, son of Rudra Jaya Kumára, belonging to the *gótra* of Bháradvája, the *pravara* of Bháradvája Angirasa and Vrihaspati, a follower of the Vájasaneyá *sákhá* of the Yajurveda and an inhabitant of the village तर्कायिका Tarkáyiká.

The second copper-plate records the grant of certain other lands by Deva Varmma Deva, the Lord of Kálinjara, the son of Vijaya Pála Deva and the grandson of Vidyádharma Deva ; the recipient of the gift (which was made on the occasion of the annual *shradh* of the donor's mother, the Queen *Bhuvana Deví*) is mentioned as a Brahman by name Abhimanyu, the son of Bhatta Ellá, the grandson of Jayavara, belonging to the *gótra* of Bháradvája, the *pravara* of Angirasa Vrihaspati and Bháradvája, a follower of the Yajur Veda *sákhá* and an inhabitant of *Tukári bhatta gráma* which may be translated to mean the village of *Tukári* inhabited by *Bhattas*, i. e. Brahmans learned in the Vedas. Deva Varmma's name is new, not being mentioned, in any of the previously discovered inscriptions or copper-plates, or the annals mentioned in Major-General Cunningham's *Archæological Survey of India*, Vol. II. The name of the Queen-Mother *Bhuvana Deví* is also new.

Mr. Smith had forwarded transcript and translations of the inscriptions on the copper-plates which I have revised. They will be published, with a detailed Note, in the Society's Journal.

The Pandit then spoke to the following effect :

This concludes the announced programme of the meeting, but before I

resume my seat I hope to be permitted to speak a few words about the agreeable surprise which the Chairman had provided for us. Dr. Rájendralála has laid the Society under many obligations, but his latest labour of love is as valuable as any that preceded it. The work of cataloguing MSS. is no doubt very trying and in the main uninteresting, but the very absence of attractions ought to make us grateful to those who undertake the necessary task. In the midst of an increasing load of years and anxieties, and a multiplicity of avocations and pursuits, the learned Doctor has given an example of perseverance and assiduity which men younger in years would do well to imitate. The author's name was a sufficient guarantee of the value of the work, and I beg to propose that—

The best thanks of the meeting be tendered to Dr. Rájendralála Mitra for the labour of love which he has performed in bringing out the first fasciculus of an improved Catalogue of the Society's Sanskrit MSS.

The motion was seconded by Mr. W. T. Blanford and carried unanimously.

Note on the Floral simulation of Gongylus gongylodes, Linn.—By Dr. J. ANDERSON, Superintendent Indian Museum, Calcutta.

Dr. ANDERSON said, that he was indebted to Mr. C. T. Buckland for the opportunity to exhibit some living examples of a very remarkable form of Orthopterous insect. Three of the insects were alike and were probably the females of a fourth insect which, however, differed from them considerably in size and colour, as well as in the absence, or merely rudimentary development of certain leaf-like appendages which are a striking feature in the larger insects. Dr. Anderson expressed regret that, owing to the temporary absence from Calcutta of Mr Wood-Mason, he was deprived of the special knowledge which Mr. Mason possesses regarding the Orthoptera, as he would possibly have been able to say if all the insects belonged to one species, i. e. whether the small brown insect is the male of the larger and green coloured individuals.

These insects, however, all came from the same locality, having been forwarded to Mr. Buckland by Mr. Larymore of the Central Jail at Midnapur. Mr. Larymore had procured them from the neighbouring country district where Santál women and children had hunted them out and brought them in, hanging on branches or twigs of a bush, somewhat like a wild plum tree. They are also said to be found upon rose bushes, and in connection with this it was observed that, in Midnapur, they were known as rose-leaf insects from the circumstance that when the insect is more developed and furnished with wings, the foliaceous appendages are said greatly to increase in size and exactly to resemble rose leaves. Dr. Anderson, however, was disposed to think that more than one species might probably occur in

the Midnapur district, and that these insects with the larger foliaceous expansions might be distinct from the species now before the Society.

Mr. Buckland had made over these insects to Dr. Anderson, and since that time they have been regularly fed upon house-flies and grasshoppers; the latter, however, appear to be rather too strong for them and they therefore prefer the flies. They have been tried with small fragments of plantain and custard-apple which they not only eat, but the juice of which they seem to suck with considerable avidity. Dr. Anderson, however, thought that it was the moisture of these fruits that was the chief attraction to these insects, for the entire character of their organization indicated a rap-torial habit.

Dr. Anderson went on to say that he had succeeded in identifying the three, larger insects by means of a single dried specimen in the Indian Museum which, however, was fully mature and provided with wings. These remarkable insects proved to be the pupæ of a peculiar species of *Mantis* which was known to Aldrovandus* who figured it more than a century and a half before the first appearance of the *Systema Nat.* of Linnæus to whom it was known as *Gryllus gongylodes*† and also as *Mantis gongylodes*‡ and since the time of Aldrovandus it had been figured in a variety of works on Natural History, but apparently in every instance from mature, and seemingly from dried specimens, so that the colours of the insect during life had never been correctly described.

So much by way of introduction to these remarkable pupal Mantises, the recognized scientific name of which is *Gongylus gongylodes*, Linn.

The reason which induced Dr. Anderson to bring them to the notice of the Society had now to be pointed out. On looking at the insects from above, they did not exhibit any very striking features beyond the leaf-like expansion of the prothorax and the foliaceous appendages to the limbs, both of which, like the upper surface of the insect, are coloured green, but on turning to the under surface the aspect is entirely different. The leaf-like expansion of the prothorax, instead of being green, is a clear, pale lavender-violet with a faint, pink bloom along the edges of the leaf, so that this portion of the insect has the exact appearance of the corolla of a plant, a floral simulation which is perfected by the presence of a dark, blackish brown spot in its centre, over the prothorax, and which mimics the opening to the tube of a corolla. A favourite position of this insect is to hang head downwards among a mass of green foliage, and, when it does so, it generally remains almost motionless, but, at intervals, evinces a swaying movement as of a flower touched by a gentle breeze, and while in this attitude, with its

* Ins. th. 12, fig. 21 (1602); edit. Francft. b. 7, fig. 2, 3 infra (1623).

† Linn. Mus. Ludow. Ulr. 112, 3: Linn. Syst. Nat. H. 1767, 690.

‡ Stoll Spectr. et Mant. fig. 66, 69 ♀; Oliv. Encycl. Ins. VII, 624, 7; fig. 2-5 ♀.

fore limbs, banded violet and black, and drawn up in front of the centre of the corolla, the simulation of a papilionaceous flower is complete. The object of the bright colouring of the under surface of the prothoracic expansion is evident, its purpose being to act as a decoy to insects, which, mistaking it for a corolla, fly directly into the expectant, serrated, sabro-like, raptorial arms of the simulator. It is no new fact that many insects resemble the leaves of plants and trees, and that they manifest forms and colours which serve to protect them in the struggle for existence, but, as far as Dr. Anderson had ascertained, this was the first recorded instance of an insect simulating the corolla of a flower for the evident purpose of attracting insects towards it for its sustenance. It is even more remarkable than this, for it is a localized adaptation for such a purpose, a portion of the insect being so modified in form and colour that the appearance of the corolla of a plant is produced, in conjunction with the remainder of the long attenuated prothorax, which, at a distance, resembles the flower-stem: the anterior limbs when in repose even adding to and heightening the deception.

Mr. W. T. BLANFORD said he thought that the simulation of a flower by this or an allied species of *Mantis* had been noticed by Mr. S. E. Peal, who some years since sent a drawing of the animal to Mr. Wood-Mason. The facts had not, however, Mr. Blanford believed, been published, as Mr. Wood-Mason waited until he could obtain specimens.

The CHAIRMAN announced that the next meeting would be held in November, after the recess.

The following communications have been received—

1. *Three Translations from the Hamdseh.*—By C. J. LYALL, Esq. C. S.
2. *Note on Khánja Khán Garh near Salimábád, Burdwan.*—By BÁBU GOUB DÁS BAISAKH.
3. *Metrical Translations from the Quatrains of Umar Khayyám.*—By P. WHALLEY, Esq., C. S.
4. *Further Proofs of the Monogamy of Kálidasa's Heroes.*—By G. S. LEONARD, Esq.

LIBRARY.

The following additions have been made to the Library since the Meeting held in July last.

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,
presented by the respective Societies or Editors.

Batavia. *Natuurkundig Tydschrift voor Nederlandsch-Indië*, uitgegeven door de Koninklijke Natuurkundige Vereeniging in Nederlandsch-Indië Deelen 34—36.

Bombay. *The Indian Antiquary*,—Vol. 6, Pt. 69, 1877.

Dr. G. Buhler.—Eloven land grants of the Chalukyas of Anhilvad.

Calcutta. *The Māhabhārat*,—Vol. 1, No. 8, and Vol. 2, No. 9.

———. *The Rāmāyana*,—Vol. 6, No. 2.

London. *The Athenæum*,—Nos. 2590—2598, 1877.

———. *The Geographical Magazine*,—Vol. 6, No. 6, 1877.

E. Cross.—The India-Rubber Trees in Brasil.

———. *Nature*,—Vol. 16, Nos. 398—401, 1877.

Lyon. *La Société de Géographie*,—Bulletin, Tome 1, No. 7.

Paris. *La Société de Géographie*,—Bulletin, Avril 1877.

Ch. Maunoir.—Rapport sur les travaux de la Société de Géographie et sur les progrès des sciences géographiques pendant l'année 1876. *Des Travaux de Rhins*.—Note sur l'Annam. Extrait d'une lettre adressée au secrétaire général. Voyage de M. Mikloukho-Maklaï dans la presqu'île de Malaisie. Lettre au secrétaire de la Société Russe de Géographie (avec carte dans le texte).

Roorkee. *Professional Papers on Indian Engineering*,—Vol. 6, 2nd Series, No. 25.

Capt. J. L. Morant.—Mountain Railway for the Nilgiri Hills. *Capt. A. Cunningham*.—Discharge of Canals. *H. G. McKinney*.—Useful Australian Timbers.

Rome. *Reale Accademia dei Lincei*,—Atti, Vol. 1, Fas. 6, 1877.

Aruco e Brigidi.—Intorno alle alterazioni prodotte nell' organismo dall' azione dei bromuri.

Trieste. *Società Adriatica di Scienze naturali*,—Bollettino, Nro. 1, Vol. 8.

Yokohama. *Die Deutsche Gesellschaft für Natur- und Völkerkunde Ostasien's*,—Mittheilungen, Heft. 12, Mai 1877.

BOOKS AND PAMPHLETS

presented by the Authors.

MAX, E. H. *The Lord's Prayer translated into the Bôjingtjida, or South Andaman (Elakabêda) Language*. With preface, introduction and notes by Lieut. R. C. Temple. 8vo., Calcutta, 1877.

- RAJENDRALALA MITRA, DR.** A scheme for the rendering of European Scientific Terms into the Vernaculars of India. 8vo., Calcutta, 1877.
- TENNANT, J. F., COLONEL.** Report on the Preparations for, and Observations of, the Transit of Venus, as seen at Roorkee and Lahore on December 8, 1874. 4to., Calcutta, 1877.
- THOMAS, EDWARD.** Jainism, or the early faith of Asoka. Pamphlet, 1877.
- VON MUELLER F., BARON.** Select Plants readily eligible for Industrial Culture or Naturalisation in Victoria, with indications of their Native Countries and some of their Uses. 8vo., Victoria, 1876.

MISCELLANEOUS PRESENTATIONS.

Selections from the Records of the Madras Government, No. 59: Annual Report of the Civil Dispensaries for 1875-76.

THE GOVERNMENT OF MADRAS.

A Catalogue of Sanskrit MSS. existing in Oudh, for the quarter ending 30th September, 1875.

THE GOVERNMENT OF THE N. W. PROVINCES.

Report on the working of the Government Charitable Dispensaries in the Central Provinces for 1876.

Report on the Lunatic Asylums in the Central Provinces for 1876.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

The Fifth Annual Report of the Board of Directors of the Zoological Society of Philadelphia, 1877.

THE SECRETARY,

Report on the Preparations for, and Observations of, the Transit of Venus, as seen at Roorkee and Lahore, on December 8, 1874. By Colonel J. F. Tennant, R. E.

CAPTAIN J. WATERHOUSE.

The African Exploration Fund. Pamphlet.

THE ROYAL GEOGRAPHICAL SOCIETY.

PERIODICALS PURCHASED.

Berlin. *Journal für die reine und angewandte Mathematik*,—Band 88, Heft 2, 1877.

L. W. Thomé.—Zur Theorie der linearen Differentialgleichungen.

Calcutta. *The Indian Medical Gazette*,—Vol. 12, No. 7.

Dr. Max von Pettenkofer.—Nine Propositions bearing on the *Ætiology and Prophylaxis of Cholera*, deduced from the official Reports of the Cholera Epidemic in East India and North America.

Giessen. *Jahresbericht über die Fortschritte der Chemie für 1875, Heft. 3.*

Göttingen. Göttingische Gelehrte Anzeigen,—Stücke 22, 23, 25 and 26.

———. ————. ————. Nachrichten, Nos. 12—14.

Leipzig. Annalen der Physik und Chemie,—Ergänzung Band 8, Stück 3 ; Band 160, Stück 4 ; Neue Folge, Band 1, Heft 1—2.

Band 8, Stück 3. *A. L. Holtz*.—Ueber die Magnetisirung ellipsoidischgeformter Eisen und Stahlkörper und die Veränderung des temporären und permanenten Magnetismus. *W. Holtz*.—Einige wesentliche Verbesserungen an einfachen und zusammengesetzten Influenzmaschinen.

Band 160. Stück 4. *P. Glaziel*.—Neue Versuche über die Ausdehnung von Körpern durch die Wärme.

Band 1. Heft 2. *E. Edlund*.—Ueber die electrischen Ströme, welche bei dem Strömen der Flüssigkeiten durch Röhren entstehen. *W. Hankel*.—Ueber das magnetische Verhalten des Nickels und des Kobalts.

———. ————. Beiblätter, Band 1, Stücke 5—6.

Stück 5. *Uchatius*.—Ueber die Erhöhung der Elasticitätsgrenze der Metalle durch dauernde Spannung.

Stück 6. *G. Pisati*.—Ueber die Elasticität der Metalle bei verschiedenen Temperaturen. *G. Pisati* und *G. Saporito-Ricca*.—Festigkeit des Eisens bei verschiedenen Temperaturen.

London. The Academy,—Nos. 265, 267—270, 1877

———. The Chemical News,—Vol. 35, Nos. 914, 916—918, 1877.

No. 917. The Jablockhoff Electric Candle.

———. The Society of Arts,—Journal, Vol. 25, Nos. 1280, 1282—1285, 1877.

No. 1280. *C. W. Vincent*.—Spontaneous Combustion in Factories and Ships.

No. 1285. *A. V. Harcourt*.—The Chemistry of Gas Manufacture. Economic Plants in Jamaica.

Paris. Annales de Chimie et de Physique,—5th Série, Tome 11, Juin 1877.

C. Bernard.—Critique expérimentale sur la fonction glycogénésique du foie.

———. Comptes Rendus,—Tome 84, Nos. 23—26.

No 23. *MM. E. Matthieu et V. Urbain*.—De l'affinité des globules sanguins pour l'acide carbonique. *M. C. M. Goulier*.—Baromètres à siphon dont les indications ne sont pas influencées par les variations de la température. *M. V. Feltz*.—Expériences démontrant qu'il n'y a pas dans le sang putréfié toxique de virus liquides ou solides ou dehors des ferments organisés.

No. 24. *M. F. Ferrier*.—Etude comparative des observations de jour et de nuit. *M. Gramme*.—Recherche sur l'emploi des machines magnéto-electriques à courants continus. *M. L. Périer*.—Sur les variations du diamètre des globules rouges du sang dans l'espèce humaine au point de vue de l'expérimentale légale.

No. 25. *P. Secchi*.—Sur l'état actuel de l'atmosphère solaire. *M. Th. du Moncel*.—Sur les électro-aimants à rondelles de fer. *M. Ch. Morel*.—Recherches sur le tétrachlorure de carbone et sur son emploi comme anesthésique.

No. 26. *M. Ch. Richet*.—De la recherche des acides libres du suc gastrique. *M. M. Raynaud*.—Sur la lymphe comme agent de propagation de l'infection vaccinale.

Paris. *Revue des Deux Mondes*,—Tome 21, Livraison 4; Tome 22, Livraison 1, 1877.

Tome 21, Liv. 4. *M. E. Burnouf*.—L'âge du bronze et les origines de la métallurgie. *M. E. Planchet*.—L'archipel des Philippines. L'industrie, le commerce, la situation politique.

———. *Revue Scientifique*,—Nos. 51—53, 1877.

No. 52. *M. G. de l'arigny*.—Les Musulmans des Indes, et la question d'orient.

BOOKS PURCHASED.

BOUCHIER, R. *Divan de Férzadk, récits de Mohammed Ben-Habib d'après Ibn-el-Arabi, publié sur le Manuscrit de Sainte-Sophie de Constantinople.* Pts. 3—4, 4to., Paris, 1875.

FAIDHERBE, LE GÉNÉRAL. *Les Dolmens d'Afrique.* Pamphlet, Paris, 1873.

GRIMBLAT, M. *Extraits du Paritta, textes et commentaires en Pali, avec introduction, traduction, notes et notices par M. Léon Feer.* 8vo., Paris 1872.

KHANIKOFF, NICOLAS DE. *Mémoire sur l'Ethnographie de la Perse.* 4to., Paris, 1866.

MEYNARD, BARTIER DE. *Description historique de la ville de Kazvin, extraite du Tarikh-Guzidèh de Hamd Allah Mustôfi Kazvini.* 8vo., Paris, 1858.

———. *Extraits de la Chronique Persane d'Hérat.* Pts. I. II. 8vo., Paris, 1861.

———. *La Poésie en Perse.* Demy 8vo., 1877.

———. *Tableau Littérature du Khorassan et de la Transoxiane au IV^e Siècle de l'Hégire.*

SANGUINETTI, R. B., DR. *Satire contre les principales tribus Arabes, extrait du Raîhân al-Albâd.* Pamphlet, Paris, 1853.

SENART, M. E. *Kaccâyana et la littérature Grammaticale du Pâli.* 8vo., Paris, 1871.

WOEPKE, M. F. *Sur l'introduction de l'Arithmétique Indienne en occident et sur deux documents importants publiés par le Prince Don Balhasar Boncompagni et relatifs à ce point de l'histoire des Sciences.* 4to., Rome, 1859.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR NOVEMBER, 1877.

The Monthly General Meeting of the Asiatic Society was held on Wednesday, the 7th inst, at 9 o'clock P. M.

W. T. BLANFORD, Esq., F. R. S., Vice President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The receipt of the following presentations were announced—

1. From the author, "Original Texts, on the Origin and History of the People of India, their Religion and Institutions," 2nd Edition, Vols. 1 to 5, by Dr. J. Muir.

2. From Dr. Burmeister a copy of "Description physique de la République Argentine." Tome 2.

3. From Professor P. E. Foucaux, a copy of his translation of "Malavika et Agnimitra, drame Sanskrit de Kalidasa."

4. From Mr. Hyde Clarke, a copy of his pamphlet on "The Khita and Khita-Peruvian Epoch."

5. From Mr. R. N. Cust, a copy of his pamphlet on the "Languages of the Indo-Chinese Peninsula and the Indian Archipelago."

The SECRETARY said that on Mr. Blochmann's recommendation the Council had ordered this pamphlet to be reprinted in the Proceedings.

6. From R. S. Ortori, a copy of a "Report of Progress for the first year of the Oil Surveys of Japan." By B. S. Lyman.

7. From the Rev. J. Long, a number of books and pamphlets.

8. From Mr. S. E. Peal, a copy of his pamphlet entitled, "In regard to the question of the Pre-Aryan Races inhabiting India, the following peculiarity of the river names in Assam, and some of the countries adjoining is worthy of notice.

9. From Messrs. W. E. Ayrton and J. Perry, Japan, copies of the following pamphlets by them:—The Resultant fault in the Conduction, Insulation, and Circuit Tests. On certain Modifications that must be introduced in the fundamental Notions of the Mathematical Theory of Electricity. A Duplex partial Earth Test.

10. From the Trustees of the Indian Museum, a copy of the "Catalogue of the Mollusca in the Indian Museum. Fas. II." By G. Nevill.

11. From Commander Dundas Taylor, Superintendent of Marine Surveys, the following Charts :—Entrance to the Salween River [Maulmain River.] Cape Comorin to Cocanada. Approaches to Point de Galle Harbour.

12. From the Government of India, Home Department, a set of Photographs of the Kuntonggur Temple in Dinájjpur, taken by the late Mr. John Ravenshaw, C. S.

13. From Mr. E. T. Atkinson, a number of pamphlets.

The following gentleman, duly proposed and seconded at the last Council Meeting, was balloted for and elected an ordinary Member—

Alexander Grant, Esq., M. I. C. E., proposed by Lieut.-General R. MacLagan, R. E., seconded by Capt J. Waterhouse.

The following are candidates for ballot at the next Meeting—

1. Dr. Krishna Dhar Ghose, Civil Surgeon of Rangpur, proposed by G. A. Grierson, Esq., C. S., seconded by H. Blochmann, Esq.

2. L. Maudelli, Esq., Darjiling, proposed by W. T. Blanford, Esq., seconded by Capt. J. Waterhouse.

The CHAIRMAN announced to the Meeting that in accordance with Rule 7, the following gentlemen had been balloted for and elected ordinary Members by the Council during the recess—

1. Bábu Pratápanaráyana, Siñha, Deputy Magistrate, Jehánahád, proposed by Bábu Pratápachandra Ghosha, seconded by H. Blochmann, Esq.

2. Bábu Jánendrachandra Ghosha, Calcutta, proposed by Bábu Pratápachandra Ghosha, seconded by H. Blochmann, Esq.

3. Bábu Kedaranátha Datta, proposed by Bábu Pratápachandra Ghosha, seconded by H. Blochmann, Esq.

4. Captain H. W. Clarke, R. E., Calcutta, proposed by Captain J. Waterhouse, seconded by H. Blochmann, Esq.

5. John Hart, Esq., Solicitor, High Court, Calcutta, proposed by W. Swinhoe, Esq., seconded by Captain J. Waterhouse.

6. J. Digges la Touch, Esq., C. S., proposed by H. Blochmann, Esq., seconded by Captain J. Waterhouse.

The CHAIRMAN announced that arrangements had been made for publishing an extra volume containing the descriptions by Messrs. Moore and Hewitson of the new species of *Lepidoptera* in the late Mr. Atkinson's collections, as announced at the March meeting. It was proposed that the volume should be in four parts quarto. The first part would be put in hand at once, and the remaining three parts would be completed during the course of the next two years.

The work would be illustrated by coloured plates. Owing to the expense 225 copies only would be printed and would be available to Members by purchase, after presentations had been made to the Societies interested in Natural History exchanging with the Society.

The SECRETARY read the following extract of a letter from Dr. G. E. Dobson on the subject of the busts of Drs. Stoliczka and Oldham.

"On Friday last I met Wood-Mason in London, and we visited Geflowski's studio together. We found both busts completed. That of Oldham is a very striking likeness, and, according to his wish, is undraped. We were both most agreeably surprised to find that the finished bust of Stoliczka is not only as good a likeness as could, under the circumstances, be expected, but is also a very pleasing piece of statuary considered from an artistic point of view, and one that will, in every respect, adorn the rooms of the Asiatic Society. No one should be more capable of judging of the likeness than Wood-Mason who almost lived with Stoliczka, and he is altogether well pleased with Geflowski's work; indeed, he considers the bust is much to be preferred to the painting which, although not a pleasing picture, exhibits an unmistakeable likeness of our ever-lamented friend.

"The bust of Stoliczka represents him attired in a morning coat with cravat tied in a cross bow showing some shirt front. The first model showed a military uniform which I thought in no respect suitable, and I got the other members of the Committee to consent to a change to the dress I have described above which was his usual costume, and which I am sure the Calcutta Committee will approve of also.

"Placing a pair of spectacles on the bust wonderfully increases the likeness.

"I feel sure that you will, on the whole, be pleased with the bust. Much allowance must be made for the difficulties a sculptor has to contend with who has to work from photographs only."

Mr. BLANFORD having vacated the chair, it was taken by Dr. ANDERSON.

The following papers were read—

1. *On a supposed new Sheep from the Central Hills of Kelat.*—By A. O. HUME, C B.
(Abstract.)

The skull upon which this species is founded was sent by Major Sandeman from Kelat, and is of about the same size as that of *O. cycloceros*, the 'Gad' or 'Urial,' the horns are longer and more slender, and instead of curving in the same plane as they do in *O. cycloceros* and *O. Pignoi*, they curve outwards in the form of a spiral. They thus differ from the horns of *O. cycloceros*, much as, on a larger scale, those of *O. Karelini* do from

those of *O. Hodgsoni*. No skin has hitherto been obtained. It is proposed to name this new sheep *O. Blanfordi*

The paper will be published, with plate, in Part II of the Journal.

2. *Notes on a collection of Chiroptera from India and Burmah, with descriptions of new species.*—By G. E. DOBSON, M. A., M. B., F. L. S. &c.

(Abstract.)

The collection examined comprised specimens from Sind, collected by Mr. H. E. Watson and Mr. W. T. Blanford, from Travancore, procured by Colonel R. H. Beddome, and from the neighbourhood of Maulmain, obtained by Mr. Limborg. The following species were noticed in each case:

From Sind:—

Cynopterus marginatus.

Scotophilus Temmincki.

S. pallidus.

Vesperugo abramus.

V. Kuhlii.

V. (Vesperus) nasutus, sp. nov.

From Travancore:—

Phyllorhina speoris.

P. fulva.

Megaderma lyra.

Scotophilus Temmincki.

From Burmah (neighbourhood of Maulmain.)

Phyllorhina larvata.

Vesperugo (Hesperoptenus) Tickelli.

V. (H.) Blanfordi, sp. nov.

The paper will be published in Part II of the Journal.

3. *Note on two species of Asiatic Bears, the Mamh of Baluchistan and Ursus pruinovus, Blyth, of Tibet, and on an apparently undescribed Fox from Baluchistan.*—By W. T. BLANFORD, F. R. S.

(Abstract.)

The specimens described consisted of a bear's skin and two fox-skins from Baluchistan, sent by Major Mockler from Gwádar, and a bear's skin sent by Mr. Mandelli and believed to have come originally from Lhasa.

The bear from Baluchistan is the "Mamh" concerning which there has recently been a discussion in the newspapers. The skin is that of a small brown bear, with small claws, and a pectoral band not extending up the sides of the neck. It appears to be undescribed, and is named *U. Gedrosianus* from the country in which it is found. It is easily distinguished from *U. labiatus*, *U. arctus*, *U. syriacus* and *U. isabellinus* by its

short claws, and by its comparatively short fur, and from *U. torquatus* (*U. tibetanus*, auctorum) by its brown colour. The bear from Tibet appears to have been indicated by Blyth under the name of *U. pruinus*. It proves not to be, as Blyth supposed, a variety or ally of *U. torquatus*, but to be more nearly affined to *U. isabellinus*, from which it is distinguished by its black legs and larger molars.

The fox from Baluchistan is probably the same as the Bushire species hitherto referred to *Canis famelicus* of Rüppell, a Nubian form. The Baluchistan animal appears distinguished by being much greyer in colour, by wanting the dorsal chestnut stripe, and by its much smaller size, the skull measuring only 8·6 inches in length. It is proposed to name this fox *Vulpes canus*.

The paper will be published in Part II of the Journal.

4. *On an apparently new Hare and some other Mammalia from Gilgit.*—

By W. T. BLANFORD, F. R. S.

(Abstract.)

This paper contains notes on the following animals collected by Captain Biddulph in Gilgit and the neighbourhood.

1. *Vulpes montanus*, a peculiar variety in summer dress.

2. *Lutra* sp.

3. *Mus* sp. allied to *M. Bactrianus* but probably new.

4. *Lepus Biddulphi*, sp. nov. allied to *L. Tibetanus*, *L. Pamirensis*, &c., but apparently distinct from all. It is distinguished from *L. Tibetanus* by its longer fur, by having the rump of the same colour as the back, and by several differences in the skull, such as having the nasal bones abruptly truncated and not rounded at their posterior extremity, and both the cranium and lower jaw much lower in proportion to the length. From *L. Pamirensis* the new species is distinguished by the fur being less dense, by the hair on the anterior portion of the ears not being harsh, by wanting the grey rump, &c.

5. *Lagomys auritus*, var. The paper will be published in part II of the Journal.

The Council have much pleasure in reprinting from the Transactions of the Philological Society, with the permission of the author, the following pamphlet in continuation of a similar paper on Eastern Indian Languages printed in the Proceedings for January last.

On the Languages of the Indo-Chinese Peninsula, and the Indian Archipelago.—By R. N. CUST, Esq.

"In our report of last year on the subject of the Non-Aryan Languages of India,* we ended abruptly on the confines of the Political Govern-

* *Vide* Proceedings, A. S. B. January 1877.

ment of Bengal. It was necessary, for want of space, to draw the line somewhere; but there was no ethnical or linguistic reason for pausing there, and we now take up the thread of our narrative, and enter into British Burmah, and thence proceeding southward into the Indo-Chinese Peninsula, notice the islands of the Indian, as distinguished from the Austral Archipelago, and throw our net over the whole country which intervenes betwixt India and China, the debatable land of the Brahminical and Buddhist religions

“To avoid the charge of unnecessarily repeating the statements of others, it may be stated that this region has never been treated as a whole since Leyden's paper on the Indo-Chinese Languages in the *Asiatic Researches* of 1808, a masterly production for the time; and yet some of these languages have been known in Europe by published treatises for more than two hundred years. Max Müller, in his *Lectures on the Science of Language*, avoids the subject, and refers his readers to his Letter to Bunsen, an Appendix to the *Philosophy of History*, wonderful for the period, but a book not readily accessible, and now twenty-five years behind date. Whitney, in his *Life and Growth of Languages*, disposes very summarily, and in the lump, of this great family. Hovelacque, in his *Linguistique*, dated 1870, fails, where a French book ought to have been strong, for he fairly shirks the Cambojan, and treats the Annamite most inadequately. He is not strictly correct with regard to Siamese and Burmese. He ignores altogether the Mon, Shan, and Savage Languages, and has no notice of Kawi. Both Hovelacque and Whitney had access to Friederich Müller's *Linguistic Essay in the Voyage of the Novara*, and quote from it freely. The valuable books of Crawford, Raffles, and Marsden, the learned essays of Logan, Bigandet, Lowe, Bastian, and others, are known to few; even the great epoch-making essay of Humboldt on the Kawi language has never appeared in an English dress. As to the French writers on the Cambojan and Annamite, the Dutch writers on Malay, Javanese, Kawi, Bugi, Macassar, and the numerous inferior languages of the Malay Archipelago, the Spanish writers on Tagál, Bisayan, and the minor languages of the Philippines, their very name is unknown. Mr. Latham's chapters, in his *Elements of Comparative Philology*, on these languages, fall short of the fullness and accuracy which distinguish the rest of his work, and are twenty years behind date. The newly-published anonymous *Dictionary of Languages*, though very brief, is for the most part correct.

* Crossing the political boundary of British Burmah, we find ourselves in the Province of Arracan, the people of which are called Mugs, (derived from Maghada, according to Leyden,) are partly Buddhist, partly Brahminical in religion, and speak a dialect of the Burmese, from whom they are separated by the great wall of the Yoma range of mountains. The name

Rakheng is applied to the language of the inhabitants of Arracan, from the Pali word meaning 'abode of demons.' The hill tribes are pagan and savages, and, with the exception of the Khyeng, we have little knowledge of their language. They are the same as those alluded to by name in our last year's paper as on the frontier of Chittagong, the Mrúng, Kumi, and Mru. Latham calls them the tribes of the River Koladyn or Kaladan, the limit of Kalas, the term by which they call all foreigners, quoting from a notice of them under that name by Latter in the Journal of the Bengal Asiatic Society. Their numbers, features, and relative relation to each other, and to Burmese, has still to be determined; they have no written character, and will probably in the progress of civilization disappear. A vocabulary of these dialects is given in an appendix to Captain Lewin's Hill Tracts of Chittagong, 1869. Sir A. Phayre and Mr. Bryan Hodgson describe them in J. A. S. B.

"Of one language, the Khyeng or Hiou, spoken by a people who are pagans, but the most extensively diffused in the great Western Mountain range of Burmah, and who are settling down to regular agriculture, we have a satisfactory grammatical memorandum by a Member of our Society, Major G. E. Fryer, who occupies the post of Deputy Commissioner of the District of Sandoway, in which they are included. This language may be classed as in the first stage of agglutination; the tones are very elaborate, but the construction simple. Attached to these notes is a vocabulary: there is no written character, no literature, and, with the exception of notices and vocabularies in the Asiatic Researches and in the J. A. S. B., in which also Major Fryer's note appeared, we have no further information.

"Passing down the coast we come to the delta of the great river of Burmah, the Irawadi. This has, from prehistoric times, been occupied by a race separate in language from the Burmese; the race is known as Talain, the language as Peguan or Mon, and the province as Pegu. They had their day of greatness, but within the last century were overpowered by the Burmese, who occupy the middle regions of the Irawadi, and during their time of power tried to exterminate this language, which has, however, revived, since, in 1853, Pegu became a British Province, and Rangoon the capital of British Burmah.

"Dr. Mason and Sir A. Phayre have stated their opinion in favour of a connexion linguistically between the Mon and the language of the Hos or Koles, on the other side of the Bay of Bengal, in the Western District of Bengal. This is one of the hard questions of Philology and Ethnology. We have an excellent grammar of the language, by the late Rev. Mr. Haswell, a Protestant Missionary, who does not agree in this theory. Moreover, a connexion is asserted linguistically, by the late Dr. Logan, between the Mon and the Annamite language, on the confines of China,

which we shall notice further down. Sir A. P'hayre states that it is uncertain, when these first immigrant Mons arrived; they were joined by a Dravidian emigration from the Indian Peninsula, and the word Talain survives as a record of the Telinga connexion.

"The Mon alphabet is of an Indian source through the Dravidian, but there is little trace in the language of that connexion. Dr. Bastian (in the *Journal of the Royal Asiatic Society*) says that the Mons adopted for their sole alphabet (religious and secular) the Pali alphabet, which is used everywhere else for the sacred books only. There is no dictionary of the language, but a vocabulary is attached to the grammar, and there are vocabularies by Crawford, Buchanan, Sir G. Campbell, and Hunter. The people are Buddhists. Their sacred books are translated into Mon, abundantly interspersed with Pali, an inflective Aryan language. There are many loan Pali and Burmese words brought in by religious and secular domination. It is classed as monosyllabic, but it is impossible, in the space allotted in this Report, to define with precision the transition stages of Monosyllabic and Agglutinating languages. There are no changes in nouns to mark their relations to other words; this is shown only by position. Numbers and genders are indicated by addition of words: tenses and moods are inadequately shown by affixes and prefixes; frequently there is nothing but the connexion to show them. The construction of the language is quite different from the Burmese, the location of words being almost always the reverse. This is one of the languages, whose days are numbered; it may, survive in villages, or among the emigrants settled in Siam, but Burmese will supplant it in the towns. We have a translation of the New Testament in this language.

"Following the coast to the limits of British Burmah, we enter the province of Tenasserim. A portion is occupied by the same race of Peguans and the remainder by congeners of the Burmese race, speaking a dialect of that language under the name of Tavoyi or Taneagsari. A list of the words of a dialect in Tenasserim called Tungtho or Thountú, is given by Messrs. B. Hodgson and Hunter, as collected by Dr. Morton, which, according to Mason, is nearly allied to Pwo Karén, and according to Bastian, had an alphabet of its own. The most southern portion of this long narrow province is only separated by a low range of hills from the kingdom of Siam; but in the mountainous tract in the corner of junction of Siam and Burmah is the country of the Karéns, who have obtained a notoriety from their ready acceptance of some form of the Christian religion at the hands of energetic missionaries, Judson, Mason, and Wade, to whom we are indebted for ample linguistic information. They are three distinct tribes: the Sgan and the Pwo, and the Karenni or Kaya, or Red Karén. They were downright savages, and pagans, and many are so still. The Red

Karén are purposely left independent both of the British and Burmese Governments: their dialects differ so much as to render communication as difficult as if they were separate languages. Sir A. Phayre reports within the limits of British Burmah the following subdivisions: Pakee, Maune Pagha, Bghac, Weo-Waoo, and Ngae.

"It is asserted that the Kakhyens, who will be noted hereafter, and Karéns, are identical: the legends of the Karéns certainly point to a descent from the mountains. Out of fifty thousand nearly one-half are Christians. They have no literature, and no indigenous character: the Roman and Burmese are both employed. The field has been well worked. We have grammars by Wade and Mason, in two dialects; dictionaries by Wade and Mason; vocabularies by Hunter, Bennett, Wade, and Mason. Portions of the Bible have been translated into three dialects, and numerous contributions made to journals, and many separate volumes published in Europe and America.

"Ascending the Irawadi, we find its middle course occupied by the Burmahs, or Burmese, speaking the great Burmese language, called in early days the Avan, a language great in religion, politics, and literature, the chief language of the eastern portion of the Tibeto-Burman group, as the Tibetan is of the northern. The word Burmah is a corruption of Myamma, or Marumma, which is again a contraction of the Sanskrit Mahavarna, the honorary title of the Khshatrya. The Burmese are a nation of boundless pride and great pretension, but they point to the Rakheng, or Arrakanese, as the oldest dialect of their language. The Burmese and Tibetan are the only literary languages in the midst of a series of unlettered and savage congeners, but a closer scrutiny will, before long, point out the distinguishing features, and enable a proper classification to be made of sub-families, while admitting a common origin. In addition to those already named, and the Kakhyens, to be noticed in next paragraph, there are numerous kindred languages of the Tibeto-Burman family within the government of Bengal and Assam, and noticed in the report of last year. There were seven races of the Myamma stock, Rakheng, Burmese, Talain, Khyen, Karén, Yo, and Tavoyi. The Burmese have their own character, derived from the Indian. The Pali is their sacred language as Buddhists. Leyden, as far back as 1808, remarked that the Burmese was not purely monosyllabic, but a connecting link between monosyllabic and polysyllabic languages; this opinion has been justified by a more intimate acquaintance. By many authorities Burmese and Karén are classed as monosyllabic. Max Müller thinks that they are *not* so; but, as before stated, before any decision is arrived at, we must settle what the line of demarcation is. If the occasional use of particles, which have no meaning by themselves, removes them from the monosyllabic order, then Chinese itself, with its

dead words, must cease to be styled monosyllabic. Mere juxtaposition, moreover, is not agglutination, and further, admitting that Chinese has rudimentary traces of agglutination, it is the extent, to which this principle appears to be the rule, rather than the exception, of each language, that must decide the order to which the language belongs. All the Indo-Chinese languages admit and incorporate words from the Pali, an inflexional language, and the degree to which they break up these loan-words, and alter them, is a test of the genius of the language in assimilating discordant materials. It has been known by published works in Europe for more than a century. There are dictionaries by Hough, Judson, and Lane; grammars by Judson, Latter, and Carey; vocabularies by Leyden, Buchanan, Latham, Sir G. Campbell, and Hunter; miscellaneous treatises by Mainwaring, Chase, Towers, Phayre, and Low; and a famous treatise by Schleiermacher, on the influence of writing upon a language. This is a strong vernacular, likely to complete the absorption already commenced of all its weaker neighbours, and worthy to do so. The whole Bible is translated into Burmese.

"Ascending the river Irawadi, we find in the mountains separating Burmah from China an unruly race called Kakhyen or Kaku, known in the valley of Assam as Singpho (which merely means 'a man') or Chingpaw, Highlanders, pagans, and savages at a decidedly low state of civilization, though living in villages, and agriculturists. In Dr. Anderson's 'Expedition to Western Yunnan,' published in 1871, and his 'Mandalay to Momien,' published in 1876, we read of his long detention among these inhospitable tribes in 1868 and 1873, during two unsuccessful attempts to pass from Bhamo into Yunnan. He recognized the physical resemblance betwixt them and the Karéns, which is confirmed by their language. He gives a vocabulary of the Kakhyens, which he (perhaps incorrectly) describes as monosyllabic, spoken in an ascending tone, every sentence ending in a long clear 'ee.' The Roman Catholic Bishop Bigandet, who visited this tract, identified them with the Singphos described in our report of last year, and other tribes in the Assam valley, and noticed their resemblance to the Khyens and Karéns. The pronunciation is soft and easy; the construction of sentences simple and direct; there is no written character. Few Kakhyens, except the chiefs, could speak Burmese, but some could speak and write Chinese.

"Dr. Anderson found another tribe, blended in daily life with the Kakhyens, the Leesaws, who were perfectly distinct in every respect, and whose language was akin to the Burmese.

"Here we come upon the gates of China, and the channel of a future traffic, consecrated by the blood of Margary. We shall know more soon of the Kakhyens. We have vocabularies of them and the Leesaws, by Anderson; of the Kakhyens by Bigandet, Robinson, and Logan.

"Dr. Logan, who had rare opportunities of studying the subject, which he has illustrated by a series of learned papers in the *Journal of the Indian Archipelago* (which died with him in 1859), would divide the languages of the Indo-Chinese into two main branches: 1, the Western Himalayan, or Tibetan, which includes the Burinan, Kakhien, Karén, and their numerous uncultivated congeners in the valley of the Irawadi and Burumpootur; and the Eastern Himalayan, or Mon-Annam, including the Mon, Shan, Cambojan, and Annamite families, and all their rude congeners. It is at this point that we leave the Western Himalayan branch, and enter the Eastern region. We also leave the regions of the direct and indirect influence of British India, the great valleys of the Irawadi, Salwyn, and Sitang, which flow into the Bay of Bengal, and cross a physical and linguistic watershed into a country independent of British power, and speaking a more strictly monosyllabic language. Buddhism and the great Hindu civilization still accompany us, and at one point, indeed, the Shan civilization crosses the watershed and, leaving the valleys of the rivers Mekong and Menam, penetrates to the valleys of the Irawadi and the Burumpootur. The Shan states, which come first under notice, are divided into three groups, which are respectively subject to Burmah, Siam, and China. A fourth group, which is part of British India, known as the tribes of Khamti, Ahom, and Aitom, were included in our report of last year. In a narrow wedge of inconsiderable width, yet no less than fifteen degrees in length, the Shan language extends from the Burumpootur in Assam, a province of British India, to Bangkok on the Gulf of Siam. Max Müller declares that they cling by their roots to the same soil as the Tibeto-Burman family, which we have just described. They are known as Tai, are Buddhists, though clinging to old pagan worship of Nats and spirits; civilized, as an instance of which all the branches of the family have their own special alphabet, all no doubt of the same stock, but all with special variations. Thus we have one alphabet of the great Siamese conquering people, two varieties of the subject^a Laotians, a third of the Shans dependent on Burmah, both the latter affected by the Burmese alphabet, and circular in shape. The letters of the alphabet of the Tai Mow, or Tai Khe, within the Chinese province of Yunan, are diamond-shaped, a fact to be attributed to Chinese influence. The alphabets of the Khamti and Ahom, within the limits of British India, resemble the Shan, but with certain modifications. The language of this Tai family was, no doubt, originally the same, and is still essentially the same. They were a conquering race, who came from the north in historic times, and still hold their own, at the expense of their neighbours, with great power and vitality; their language, in process of time, became separated into dialects; there are laws of euphony, and variations of vocabulary, peculiar to each dialect. In the Shan

states the Burmese domination has left its mark. Many Pali words have crept in from religious influences. All the Tai languages are tonal, and accuracy in speaking depends on the exact knowledge of the tone; the Siamese alphabet expresses these tones, but the others do not. Books are generally metrical; the language is rich to redundancy in synonyms.

"In our last year's report we noticed the vocabularies of Khamti and Ahom in the valley of Assam. The Shan states of Burmah are represented by a Shan grammar, published by the Rev. J. Cushing, at Rangoon, in 1871, and a vocabulary is in the course of preparation. There are vocabularies by Hunter and others. It is distinctly asserted that, while the Siamese alone call themselves Thai or 'free,' all the others call themselves Tai without the aspirate, and for some unexplained reason; and, again, that the language is monosyllabic, and that the many polysyllabic words in it are loan-words from the Aryan Pali and the agglutinating Burmese; the religious language of the Shans is a mosaic of Shan, Pali, and Burmese.

"While of the Burmese Shan states we have full information, of the Chinese Shan, or Tai Mow, or Tai Khé, we have scant knowledge. Mr. Margary was killed in a Shan town, and the French expedition under Captain Lagrée passed through several of them. We have vocabularies of the Shan and Hota Shan in Yunnan by Anderson, of the Shan by Bishop Bigandet and Yule; and vocabularies of the Pa-laong or Palo, a sub-family of the Shans, by Bigandet, Logan, Latham, Anderson, and Yule. The establishment of a British Agent at Bhamo will throw light upon these dark places.

"The term 'Lawa' is said to be applied by the Chinese to all frontier tribes. The Shan states within the boundaries of the kingdom of Siam are called 'Laos.' They are Buddhists, with pagan customs, and fairly civilized, and their language has acquired in linguistic books the name of Laotian. Nothing was known of them until M. Mouhot visited them in 1861, and died on the frontier. He had followed the course of the Menam, and struck across to the Mekong. In 1861 the French expedition under Captain Lagrée and Lieutenant Garnier, ascended the Mekong as far as the neighbourhood of Talifue in Yunnan, and threw a flood of light on the country. The language is pronounced identical with Siamese, with peculiarities. Outside the civilized Laos, in a much lower stage of civilization, are downright pagan Lawas, and we find ancient inhabitants of the country still retaining their independence under the generic name of Moi, but the special name of Khasani, Khmens, Lewett, and Doe; vocabularies are supplied by Hunter, Garnier, and Mouhot.

"Leaving the river Mekong, which strikes to the east, we follow the course of the river Menam to Bangkok, the capital of the great kingdom of Siam, who call themselves 'Thai,' but were called by the Malays 'Siam.'

The Siamese language is spoken by four millions, ridiculously proud, and a conquering race, maintaining till within our time a conflict with the Burmese to the north, the Malays to the south, and the Annamites and Cambodjans to the west. Bastian remarks, in the pages of the *J. R. A. S.*, that the Siamese gradually diverged from pure monosyllabism, by the introduction of words from the Pali, and thus it differed very considerably from the Chinese; on the other hand, it is much more monosyllabic, and more powerfully accented, than the Burmese. Next to the Chinese, according to Bastian, it is richest in tones of the so-called monosyllabic languages. This language has been known to Europeans for two centuries. An inscription exists in the ruins of the old capital of Ayuthia, dated 1284 A. D. There are three idioms, that of the sacred Buddhistic books, that of the higher orders, and that of the people. In proportion to the elevation of the ideas is the introduction of Sanskrit and Pali words, accommodated to Siamese vocalization. There is an enormous religious and secular literature, in which there is a study of euphony and neglect of sense, and it is deemed an elegance to have many words in the same sentence commencing with the same letter. European printing presses are established at Bangkok, and Government Gazettes are published, but no indigenous native printing press. The King himself talks and writes good English, as did his predecessor. The best grammar and dictionary are by Bishop Pallegoix. The vocabulary of Loubere is dated 1687 A. D., and it is unnecessary to notice later vocabularies and fugitive notices of so great a language, for they are numerous, some scientific, like those by W. Schott, De Rosny, and Gützlaff; others of mere conversational utility. The New Testament has been translated into Siamese.

“Adjacent to the prosperous realm, and the well-known language of the Siamese, is the fallen and sadly-reduced kingdom, and the scarcely recognized idiom of the Cambodjan, on the great river of Cambodia, the river Mekong. All the surrounding nations admit, that the Cambodjans were their teachers in religion and science; but for the interference of the French, who have now taken the remnant of the kingdom under their protection, in all probability it would have been totally absorbed in its two powerful neighbours, Annam and Siam. It is calculated that about one million and a half still speak the modern type of the ancient language of the Khmer or Khomer, though the kingdom of Cambodia comprises only one million; the remainder are subjects either of Siam or of French Cochin-China.] The magnificent ruins of Angkor, or Nakhon Wat, have drawn attention to the subject, and among these ruins are inscriptions, in an archaic form of the special character of the Cambodjan, the most easterly derivative of the great Indian prototype alphabet, and in an archaic form of language imperfectly understood, if at all, by the modern Buddhist

priesthood ; at least, these inscriptions have not been satisfactorily translated.

(“ We walk on uncertain ground here. The great Khmer people differed essentially from their neighbours of Annam and Siam ; they are an elder race, having descended the river Mekong at a period anterior to the Thai, and before the powerful race of Annam crossed the dividing range. The present Cambojans are Buddhists, with marked pagan customs. Their language is placed by Dr. Logan in his Mon-Annam class, but it differs materially from any other monosyllabic language. It has no tones, being spoken *recto tono* ; the numeration is quinary. Lieut. Garnier remarks that modern Cambojan is a transition language betwixt the polysyllabic language of the Malay, and the monosyllabic language of Indo-Chinese. It is full of Siamese words, and Dr. Bastian remarks, that it is so full of loan-words, that for a long time it was mistaken for Siamese. Many loan-words are found contracted in the manner required by the tendency of the Cambojan language, which is certainly towards monosyllabism. It has also loan-words from Malay, Pali, Annamite, and Mon. The inscriptions have been photographed : the written annals go back to A. D. 1346, but there is evidence of a much higher antiquity to the power and civilization of the nation. We find mention of a Manuel Pratique of the Cambojan, by the late M. Janneau, who held a civil appointment in Cambodia, but so few copies were struck off, that it is not accessible. We have vocabularies by Garnier, Mouhot, Crawford, Aymonier, and a dictionary of French and Cambojan, and numerous treatises by the latter. We have an essay on the language by Mr. H. G. Kennedy, and clearly may expect that our knowledge of this important language, so accessible, and so abundant in archaic monuments, and spoken to this day by a civilized people, should be speedily brought up to a proper level.)

(“ It is stated that, in addition to the Cambojan and Laotian, above described, there are at least a score of idioms spoken on the banks of the great river Mekong, and its numerous confluent, and in the mountain chain extending from Tonquin to French Cochin-China. According to the custom of these polyglott regions, every town has at least four names, being known under a different combination of syllables by the Siamese, Annamites, Cambojans, and Savage people. Thus these wild Savage pagan races are themselves called Penoms by the Cambojans, Khu by the Siamese, Moi by the Annamese ; all these words mean ‘ savage,’ and we have seen above that the Chinese use ‘ Laws’ in much the same sense. Lieut. Garnier remarks on the important affinity of the Cambojan with the idiom of some of these Savage races.) We are in an absolutely *incognita terra*, and require a master mind, like that of Mr. Bryan Hodgson, to collect materials during a patient note-taking of twenty-five years, and a fine discernment

like that of Max Müller to arrange them. They have no written character, no literature, and we need not add that there are no grammatical sketches, and but very scant vocabularies. Among some, like the Styens, there is a Roman Catholic Mission, maintained by devoted Frenchmen, who are prepared to live and die at their posts, an example to missionaries of another Nation and Persuasion. Garnier supplies vocabularies of some of these races. The southern division consists of Samre, Xong, Stieng, Banar, Cédang, Huei, Catson, Sirie Hin, Proons. The northern division consists of So, Nauhang Mi, Khmons, Lewett, Moutse, Khos, Konga, Lolos, Kato, Honhi, Ykia, Minkia, Mautse, Miaotse. Crawford gives vocabularies of a tribe called Ka Chong, and remarks that Ka means a slave, and of others, whose names appear in Garnier's list. M. Mouhot also gives vocabularies of some of the idioms. There is a lamentable want of material, but the linguistic value of these simple uncultivated idioms on the fringe of the great Empire of China may prove of the greatest importance.

"Descending the river Mekong to the sea, we find ourselves in French Cochin-China, and the nucleus of a new civilization. Whether this settlement will pay commercially is a question; at any rate, linguistically, it is a great step in advance, and we find sweetness and light thrown round the hard questions of grammar. The French have more than a century meddled in the affairs of Cochin-China, and such meddling generally ends in annexation. The kingdom of Annam consists of two provinces, Tonquin and Cochin-China, and occupies the whole length of the eastern face of the Indo-Chinese Peninsula, extending from 8° to 23°. The central portion comprises the old Malay kingdom of Chanapa, of which the language, religion, and nationality have perished. Colonel Yule, in the *Geographical Magazine*, March, 1877, gives the history of this forgotten State, and Crawford, in his *Malay Grammar*, analyzes the vocables, and considers that it was fundamentally a local language, mixed up with much Malayan. Of the three capitals, Huot, Hanoy, and Saigon, the latter has passed by conquest into the hands of the French. The people are Buddhists, but of the Chinese type; their language is a congener of Chinese, but the lower classes use many words of uncertain origin, because they have been altered to suit the euphonic laws of a monosyllabic language, in which the use of tones presents a great difficulty to the student. Dissyllables do exist, but are rare, and therefore there is a necessity for tones to distinguish the meaning of homophones. There are abundance of particles, which have no independent existence as words, and yet they do not coalesce, so as to form one word with the word which they are employed to qualify. The sounds are easy enough to acquire, and the Roman Catholic Missionaries, who have lived and died for more than a century in the kingdom, have by ingenious additions adapted the Latin alphabet to these sounds, which makes the

study of the language to a certain extent easy, and independent of the acquisition of the native alphabet, which is composed of a selection of Chinese characters, used phonotically as a syllabary, with upwards of nine hundred varieties. So clumsy is this arrangement, that the highest literati set it aside, and use the Chinese ideographic signs, thus entailing upon themselves the labour of learning that character. In such a language the meaning has to be gathered from the position of the words and the context. The idea of past, present, and future is expressed by particles, or omitted; three-fourths of the names are formed by addition of particles to the verb; there is no passive voice; all animate objects have one determinate prefix, and inanimate another, and as an instance of the redundancy of vocables, it may be stated that there are nine different words for 'carrying,' with reference to the hand, head, etc. The word 'Army' is a portion of seventy-five compounds, and the word 'to do,' implying a sense of action, appears in one hundred and thirty-five compounds. There is an abundant literature. The nation is civilized in the Chinese type, thriving, and until the French occupation, was warlike, and ambitious. Within the memory of man the sovereigns were too proud to give a personal audience to the ambassadors of the rulers of India. The dialect of the three provinces varies to a certain extent. The famous dictionary of De Rhodes was published at Rome in 1654 A. D. with a short grammar. The standard dictionary is that of Tabred and Pigneaux in Latin. Aubaret has published a satisfactory grammar and vocabulary at Paris, 1867, for the special use of students and the French officials. The language is included in the course of the *Ecole des Langues Orientales* at Paris; and the Professor Aymonier has written treatises on Cochinchinese, as has also M. De Gramont. W. Schott has written on the language and character, so have Dr. Bastian and M. de Rosny. We may pass over numerous vocabularies of different dates and degrees of excellence. Des Michels has published at Paris, in 1869, dialogues and text-books. Our knowledge of this language is ample, but of its rude congeners, and its past history, and its actual linguistic relation to the Mon on one side, and Chinese on the other, we have still to look for information based upon scientific procedure. With this language we have completed the survey of the Indo-Chinese Peninsula, with the exception of the Malay Peninsula, which must, linguistically, be treated as an island of the Indian Archipelago.

"And before we enter on this new world we must sweep up five clusters of islands in the Indian Ocean and Bay of Bengal, so as to complete this great subject, viz., the Andamans, the Nicobars, the Maldives, the Laccadives, and the Mergui Archipelago, all of which are included within the limits of British India.

"The Andamans contain the famous convict settlement, which in 1872

cost the life of the Viceroy of India. They are densely covered with jungle which contains nothing but wild pigs and wild berries. The Andamanese, or Mincopies, are a dwarfed, woolly-haired, dark-skinned, Negrito race, pagans, in a state of absence of civilization below the practice of agriculture. They are divided into tribes, and have several languages very different, but having a few words in common, without written characters. They are as low in civilization as any tribe on earth, though on the pathway of the world's civilization for centuries; they have no numerals. We have scanty vocabularies by De Roepstorff, an official of the Indian Government, 1875; and Professor Owen, in his discourse at the Oriental Congress of London, 1874, hazards the opinion of their poor unsettled language showing more relationship to the Mon than to the Burmese.

"The neighbouring Nicobars are peopled in the interior by an equally degraded race, the Shobangs, but the majority of the inhabitants are of a very superior order, of uncertain origin, and with no admitted relationship to Malays or Burmese. They are brown, pagans, and civilized to a certain extent. Owing to intercourse with foreign ships, they speak several foreign languages. Mr. de Roepstorff, who is the officer in charge of these islands, supplied in 1875 a vocabulary of great extent of the dialects of four of the islands—Nankowry, Great Nicobar, Theresa, and Car Nicobar, as well as a limited list of words used by the shy and savage Shobangs. They have no written character, and no education. Vocabularies are also given by Colebrooke, Man, and Fonteaux in the pages of the *J. A. S. B.* In the new edition of the *Encyclopædia Britannica* there is an exhaustive article by Colonel Yule. We may fairly hope that the linguistic question as regards these two groups will be satisfactorily answered in the next quarter of a century.

"Along the Tenasserim coast, at its southern extremity, is a small archipelago of islands opposite to Mergui: in some of these reside a peaceful people, who are pagans, of uncertain race, in low civilization; they are called Silang, and we have a vocabulary by Logan in the pages of the *Journal of the Indian Archipelago*.

"On the other side of the Peninsula of India we come upon the two groups of Atolls, the Maldives, and Laccadives. The former are said to contain a population of twenty thousand; they have reached a limited degree of civilization, and were made Muhammadans by the Arabs, with a certain amount of severity, the memory of which lives to this day. Their modern written character is derived principally from the so-called Arabic, but really Indian, numerals, written from right to left. The Royal Asiatic Society possess several manuscripts. With regard to the *ancient* character there is obscurity. Lieut. Christopher, who, in the pages of the *Journal of the Royal Asiatic Society*, describes the language and character, and supplies a

vocabulary, gives specimens of eighteen ancient characters, but M. Abbadie, the Abyssinian scholar, mentions in the *Journal of the Indian Archipelago*, that this ancient character was a syllabary, and not an alphabet, and that only a portion of the characters, once possessed by Lieut. Christopher, have been made known to us. The language is akin to Sinhalese, and therefore of Aryan origin. The native Sultan is a dependent of the Government of Ceylon.

"The Laccadives lie more to the north, and are under the government of Madras, and we have accounts of visits paid to them by the officials of Government, in the *Journal of the Madras and Bombay Asiatic Society*. The language is identical with that of the Maldives.

"We now pass into the Indian Archipelago, and, with the exception of the narrow peninsula of Malacca, leave the continent of Asia, and find ourselves in a new terminology of Polynesia, Indonesia, and Malaisia, besides numerous other compounds of the word for Island (identical in Greek and Javanese), applicable to the region of Oceania beyond the limits of this report. In some linguistic books the whole family of languages as far as Easter Island is called the Polynesian, including the Malayan as a sub-family; there is, therefore, a wider and narrower use of the term. Indian culture, Indian religion, Indian written characters, and Indian names accompany us: but the Race and the Vernacular have wholly changed. As we have no actual physical boundary to this portion of our inquiry, such as was supplied by the coast-line of the Indo-Chinese Peninsula, we must proceed to draw a line on the outer edge of the Shallow-Sea region, so as to include all the islands on that submarine plateau, whose Fauna is absolutely, and whose Flora and Ethnic and Linguistic features to a great degree are distinct from the Deep-Sea region or Papuanesia. It exceeds the line at some points, so as to include particular islands, such as Lombok, Celebes, the Moluccas, Sumbawa, Flores, and Timour. Two strongly contrasted races occupy these islands, which, if lumped together, would form a large continent: first the Malays, a brown race with lank hair; secondly the Negritos, with black skins and curly hair. Between these are intermediate tribes, the exact position of which it is hard to determine. Mr. Wallace, in his survey of the whole Malay Archipelago, gives specimens of fifty-nine languages, but he omits some, which did not come within his scope: here lies the work of the philologists of the next generation, who are advised to leave the well-worn tracks of the Indo-European family, and bring order out of the existing confusion in the dialects of this Archipelago. Geographically and linguistically this region is part of Asia, while the portion, which we reject, is for the same reasons part of Australasia.

"The race spread and dominant over this region has been called the Malayan, but there are Malays proper, and tribes with only a Malay element

in their language. The word 'Malay' has a wider sense ethnologically than linguistically. For convenience sake the race is called Malayan, and the language is called Malay. The Malay proper also, though possessing considerable uniformity of physical and mental characteristics, differs in civilization and language.

"There are four great tribes, a few minor semi-civilized tribes, and a number of others who are downright savages.

"I. The Malays proper, inhabiting the Malay peninsula, and almost all the coast of Borneo and Sumatra, who all speak Malay, or dialects of it, are Muhammadans, and use an Arabic character.

"II. The Javanese, who inhabit Java, part of Sumatra, Madura, of Bali, and part of Lombok. They speak the kindred tongues of Javanese, Madurese, Balinese, Sundanese, with a special character of Indian origin. They are Muhammadans, with the exception of the inhabitants of Bali and a portion of those of Lombok, who are the sole survivors of the great Hindu civilization, and are Brahmanists or Buddhists.

"III. The Bugis or Wugis, who inhabit the greater part of the Celebes, and have a settlement in the Malacca peninsula and in the island of Sumbawa. They speak the Bugi, Macassar, and other languages, and have two characters of Indian origin, and are Muhammadans.

"IV. The Tagáls, who inhabit the Philippine Islands, and are chiefly Roman Catholic Christians: the remainder are Muhammadans. They speak the Tagál, Bisayan, and other languages, and use a special character.

"The inhabitants of the Molucca Islands, the best known of which are Banda, Tidor, Ternate, and Amboyna, are semi-civilized Muhammadans, speak a variety of languages, unintelligible to Malays, compounded of Bugi and Javanese, mixed up with the indigenous language, and have no written character

"The less-civilized Malays are the Dhyaks of Borneo, the Battas, with three dialects, the Lampungs, and Rejangs of Sumatra, the Jakuns, and other Orung Binwuh (people of the country) of Malacca. All these are pagans, the Battas cannibals, and some at the lowest ebb of civilization. Over and above are the black woolly-haired races, one of which is found in Malacca under the name of the Samang, and another of the name of Mantra, described in the *Revue de Philologie*, vol. i. Negritos are found also in some other islands, though totally absent from Java, Sumatra, Borneo and Celebes. They have survived in a state of paganism and barbarism. Another race, called by the Portuguese Alfuros (from *al fuori*, the outsiders), are found in the Celebes, Philippines, and the Moluccas, but are quite distinct both from the brown Malay and black Negrito.

"This then is our subject. About fifty identified languages come within our scope. Nine great languages or groups of languages worthy of

separate notices : 1. The Malay proper. 2. The Javanese in its modern form, and the archaic Kawi, with its three sister-languages, the Balinese, Sundanese, and Madurese. 3. The Saksak of Lombok. 4, 5. The Macassar and Bugi of Celebes. 6, 7. The Tagál and Bixayan of the Philippines. 8. The Dhyak of Borneo. 9. The Batta, with its three dialects ; the Lampung and Rejang, all in Sumatra. Crawford thinks that they may morphologically be divided into three great classes : 1. From Sumatra to Borneo and Lombok eastward. 2. From Celebes to the Moluccas inclusive. 3. The Philippine Archipelago. There is considerable difference in structure, but still more in phonetism. These languages have among them eleven indigenous alphabets, four, *viz.* the archaic Bugi, the Bima, the Kawi, and old Sundanese, obsolete, and seven in daily use, the Javanese, Bugi, Batta, Rejang, Lampong, Korinchi, and Tagál. All of these alphabets, though their use is immemorial, are phonetic, and like the Indian, are so far syllabaries, that they include an *a* in their sound. All of them (except Kawi) Crawford maintains to be of native origin, and not to belong to any alphabetical family ; he admits that some of them may have borrowed their arrangement and some modification from Indian sources. Subsequent study of the subject of Alphabets in general has led to the affiliation through the Phœnician of every known alphabet (in the strict sense) to the Egyptian hieroglyphics being looked upon as a scientific fact. The remaining languages are represented by vocabularies, but have no literature, and will probably give way to their stronger rivals. It would be a waste of time and type to set out their names, for nothing is really known worth recording ; but they stand out as a warning with many others of the futility of attempts to affiliate all languages to one, or to bring back languages to a limited number of seed plots, until the data for such theories are in a much more advanced state of preparation.

" We must here notice briefly a very great controversy, of first-rate importance both from its subject matter, and the fame of the scholars who have taken part in it. William von Humboldt in his posthumous work, ' Ueber die Kawi Sprache,' arrived at the conclusion, ' that Malay was the stem, from which the various languages spoken by the brown races inhabiting the archipelago had branched out ; that all the brown races belonged to one family, the Malay ; that a convulsion of nature had broken up a continent, and left a few survivors of the common race in the islands ; that Malay was probably an Indo-European language,' which last assertion was more particularly pressed by the illustrious grammarian Bopp. Mr. Crawford brought a local experience of forty years, and a knowledge of the vernaculars, to bear against the theories of Humboldt and Bopp, and in the dissertation in his *Malay Grammar* (1863) denied that the brown people belonged to one race : he maintained that there were several brown races

speaking distinct languages; that there several races of Negritos also, and that the Polynesian languages, properly so called, were quite distinct from Malayan. There rests the controversy, involving the deepest questions of the sciences of Ethnology, Language, and Geology. It is scarcely necessary to add that Bopp's theory as to the Indo-European connexion of the Malayan sub-family has been condemned by Max Muller, Bréal, and all scholars of weight, in spite of their reverence to their great master in Comparative Philology. One great fact stands out, that, while the Malayan languages have had no effect whatever on the higher civilization of the Asiatic continent, on the other hand, wherever Malay and Javanese have been received by other islands of the archipelago, there will be found a higher stage of civilization.

"The Malays proper had their ancestral home in the interior of Sumatra, the region of Menangkaba: thence they colonized the coasts of Sumatra, the Peninsula of Malacca, the coasts of Borneo, and made their influence felt far beyond, as adventurous pirates and merchants. Their language being simple, and easily learnt, has readily adopted loan-words from the Sanskrit, Arabic, Persian, English, Portuguese, Dutch, Javanese, Telugu, and Chinese languages, avoiding allusion to the disputed main ingredients of primitive Malayan, and the great Polynesian. In the lower classes the primitive Malay would preponderate; in classical works the learned exotics. It is asserted that the Malay of Singapore and the State of Queddah in Malacca, is the most classical. There are several dialects, and among them the Achinese, which had certain characteristics connecting it with the Indo-Chinese, and Batta languages. If there ever was a written character, it has not survived the introduction of the well-known Arabic, with additional characters. A considerable literature exists, chiefly prose, but nothing of an original nature. Van der Tuuk pronounces, in the Journal of the Royal Asiatic Society, all existing dictionaries, whether English or Dutch, to be insufficient, and not up to the mark. Of the dialects the purest are the simplest. The Malay spoken at Batavia differs very much from that spoken in the original country. Of all languages the low or common Malay is the most readily acquired. It contains no hard gutturals, or difficult consonants: it is soft and musical, and has a nice blending of vowels and consonants. It has become the *lingua franca* in the Dutch colonies; all servants are addressed in it, and European children speak it before they know their own language. The Samsans of the Queddah State in the peninsula of Malacca are Siamese by race, and Muhammadans by religion, and speak a mixed language of Siamese and Malay.

"The written language is called Jawi, a Javanese word correlative of Kawi; it means 'common,' and is antithetical to the other, which is the 'abstruse' language. As the Malays have no learned language of their

own, they use the word **Kawi** as correlative to Arabic, the depository of all their learning, chiefly translations. In some species of composition the writers introduce Arabic terms, as a proof of their learning and religious attainments, but very few Semitic words have become actually part of the Malay language.

"The nouns have no accidents; gender is only sexual; number is indicated by a word of plurality; cases by prepositions; the only instance of an inflexion is to express a possessive; the idea of time in the verb is indicated by particles, but they are often omitted; the relation of the genitive is expressed by juxtaposition, and the governing words precede the governed; a verb is changed from neuter to active by affixing or prefixing certain inseparable particles; the adjectives follow the substantives; one part of speech is formed from another with great ease by prefixing a particle, and the same word in its primitive form is often used colloquially for several different parts of speech. As in the Hindustani language, Arabic and Sanskrit words can be incorporated into the Malay at the pleasure of the speaker. It has been for centuries the *lingua franca* of the Archipelago, and its simplicity, power of adaptation, and smoothness of pronunciation, make it one of the strong vernaculars of the East, likely to absorb its weaker neighbours. The best grammars are by Marsden, Crawfurd, in English; Etout, Favre, in French; Roorda von Eysinga, 1840, Tugault, Pijnappel, 1866, in Dutch. The dictionaries are by Crawfurd, Favre, Marsden, Pijnappel; one was commenced by Van der Wall, who died, but the work is to be continued by Van der Tuuk. The vocabularies, reading books, and treatises are without number in English, French, and Dutch. The Koran has been translated into Malay; the whole Bible has been translated both into High and Low Malay, and in both Arabic and Roman characters. Newbold, Crawfurd, Logan, and Favre give us vocabularies of the Orung Binwuh, and the Samang, but there is much room for further inquiry.

"The Javanese is the language of the island of Java and the adjacent portion of Sumatra; it has a high and a low form; it is the most improved and copious of the Malayan sub-family. Its written character, derived from the Indian, is used by the Sundanese, Balinese, Madurese, and people of Lombok, whether Balinese or Sassak, and partly in Borneo and Sumatra; its letters are not in the well-known classification of the Nagari; the character is perfect to suit the sounds of the language. The foreign ingredients of the language are very much the same as those of the Malay; the grammar and the syntax are very simple, and much is left to be gathered from the context; the general features of grammar are the same as those described in the Malay. The population of Java and Madura amounts to seventeen millions; but of these, four millions speak the Sundanese, and two the Madurese. The language is one of the most copious in the world,

but it is exuberant and redundant in some particulars, and meagre in others; and the language of deference is made a study and science. The literature is threefold, Hindu, Arabic, and indigenous, and chiefly poetry. Arabic has made but a small impression on the Javanese, as they are only half Muhammadans. They write on palm-leaves or European and Chinese paper. The great proportion of words are dissyllables; there are a great number of derivatives formed by inseparable particles. No treatise of grammar existed, but they had a kind of vocabulary of synonyms in lieu of a dictionary. The Koran and the Bible have been translated into Javanese.

"The Sundanese, Madurese, and Balinese differ so materially from Javanese, though of the same stock, that they must be deemed separate languages, chiefly owing to the admixture of other languages. The Sundanese is the language of the mountaineers of the West of Java, Muhammadans, and is spoken by one-fourth of the population; the letters of the alphabet are fewer; this was probably the ancient language of the island, and has escaped the influence of foreign innovations; an additional obsolete character has been discovered on ancient and rude stones. The Bible is being translated into Sundanese.

"The Madurese is the language of the people of the island of Madura; and the immigrants from that island into Java, about 300,000 souls, and Muhammadans. It has two dialects, the Madura proper and Sumanap, as distinct as Spanish and Portuguese. Latham gives vocabularies of both, and of Balinese. It is poorer and ruder than Javanese. Although the arm of the sea is only ten miles in width, the two languages are scarcely more alike than any other two of the Western Archipelago. The letters are fewer in number; it has a dialect of ceremony, and epistolary correspondence, but Javanese is the language of business.

"The Balinese is the sole language of the island of Bali, and has spread by conquest to the island of Lombok; it is spoken by half a million; rude and simple, yet more improved than the Sundanese and Madurese, and supplied with a copious dialect of deference, borrowed from Sanskrit and Javanese. In Bali writing is on the palm-leaf only, as was the old and obsolete practice of Java. The religion of the people is still Brahmanical and Buddhist, but their faith is blended with the local customs of the island, and the original tenets are much perverted by a semi-barbarous people. Buddhists and Brahmans live in perfect harmony. It is asserted, that there is as much difference between Balinese and its sister-language, as there is betwixt French and Italian. The lower classes speak a very distinct language indeed, such as was the language before the arrival of the Javanese into Bali. Sanskrit MSS. are still found, as well as Kawi MSS., which will be noted below. The British and Foreign Bible Society are in

correspondence with their agents in Holland concerning the printing of a translation in this language.

"We now proceed to notice the grammars and dictionaries of these last four languages:—

"**JAVANESE.**—*Dictionaries*: Gericke und Roorda, Javanese-Dutch; 2nd edition by Roorda, 1875; De Groot, out of date; Favre, Javanese-French. *Grammars*: De Groot, Dutch; Favre, French; Gericke, Dutch; Roorda, Dutch; Roorda, Short Grammar, 1874, Dutch.

"**SUNDANESE.**—P. Blissé and Raden Kathavimata, Dictionary Sundanese-Dutch; Gerding, Dictionary Sundanese-Dutch; J. Rigg, Dictionary Sundanese-English; Miss Coolsura, Manual of Sundanese-Dutch, 1873; Grasshuis, Sundanese Reading-book, Dutch.

"**MADURESE.**—A. C. Vrede, Hand-book, Dutch, in two parts, and Glossary, 1876.

"**BALINESE.**—Balinese-Dutch Dictionary, by R. Van Eck, Missionary, 1876; Balinese Grammar, by ditto, 1874.

"There is an abundant literature, and great interest attaches to the monumental inscriptions, which the Dutch scholars are making known to the public by beautiful lithographed texts and translations.

"Like many other nations, the Javanese were found to be possessed of an ancient and recondite language, in which their literature and religion is enshrined. This is called Kawi, which means 'refined,' as contrasted to the 'Jawi' or ordinary language. Raffles thought that it was a foreign language of unknown origin, imported into the island. Crawford saw its connexion with the Javanese, but deemed it to be a written language of the priests. Friederich saw that it was not so, for Sanskrit occupied that position, and that Kawi was the sacred language of the people. Von Humboldt, by a scholar-like analysis, found that it was merely an archaic form of Javanese, plentifully interlarded with Sanskrit terms. Dr. Kern, of Leyden University, who is perhaps the greatest living Kawi scholar, has favoured me with the following lines, which are important, as settling the question:

"'Kawi, or more properly Old Javanese, belongs to the Polynesian family, particularly to the Malayan branch. Next akin to it are Malay and Sundanese; it is the parent of modern Javanese; it represents the language as we have it from 800 to 1400 A. D., and it has largely borrowed from Sanskrit, just as modern Javanese, Malay, and the Dravidian languages have. The grammar is unaffected by foreign influence; its structure and genius are thoroughly Polynesian; it is no more an artificial language than English or Persian; it is somewhat richer in forms, and more abundant in pronouns than modern Javanese, but the genius and general outline survive in the latter. The style of the literary work is highly elaborate and finish-

ed. In the poetry there is much descriptive power, less of feeling and grandeur.'

"When the Muhammadans occupied Java, the Hindu religion and the Brahmins took refuge in the island of Bali, which has remained Hindu to this day. There the treasures of Kawi literature have been found, though many manuscripts are found in the island of Java also, and translations of old Kawi works into modern Javanese. Grammars and dictionaries do not exist, but most interesting texts are being published. The earliest and most famous treatise on the subject is that by Von Humboldt already alluded to. Short descriptions have been published, both by Kern and Van der Tuuk, and the Dutch scholars have made the subject their own. Dr. Friederich published a full account of Bali, and the late Dr. Cohen Stuart has published a collection of inscriptions of great interest. The whole of the literature is thoroughly Brahmanical and Buddhist, for the professors of both faiths lived* apparently in harmony together. It must be borne in mind that both MSS. and inscriptions in pure Sanskrit are also found. Original versions of the great Sanskrit epics are found in Kawi, which are very important in their critical bearing on the original poems as we now have them.

"Separated by a narrow strait from Bali is the island of Lompok, but at this point we leave the Shallow-Sea plateau, and enter into a new world, as regards Fauna; but the Balinese emigrant has overleaped the boundary, and we find the sovereignty of the island possessed by Javanese in race, and Hindus akin to the Balinese in speech. The mass of the population are Sassaks, who are Muhammadans, and whose language is unintelligible to their masters, though many Sassak words are found in Malay; they have no indigenous character, but use that of the Balinese, the majority neither reading nor writing. Zollinger and Wallace give vocabularies.

"Separated by a narrow strait from Lompok is the island of Sumbawa. There are six separate languages; the two most considerable are the Sumbawa and the Bima. The people are all Muhammadans, with the exception of a few wild mountaineers. No indigenous character is now in use, but traces have been found of an ancient and obsolete character; the Bugi character of the Celebes Island is the one adopted. The third dialect, the Timoura, has kept its own numerals. Crawford, Leyden, Latham, and Raffles supply vocabularies.

"The large island of Floris or Eudè is said to have six distinct languages: 1. Eude, 2. Mangarai, 3. Kio, 4. Roka, 5. Konga, 6. Galeteng. Three of them have written characters. To judge from the vocabularies of two supplied by Crawford, there is an admixture of Malay and Javanese with indigenous vocables. The inhabitants are intermediate between Malayan and Papuan, and are pagans.

"The next island, Timour, bears that name as the most Eastern of the Malayan settlements; it is occupied by Malaysians and Negritos; the number of important languages is two; there is no written character, indigenous or adopted; one of them, the Timouri, is the *lingua franca* of the island. Latham and Crawford supply vocabularies. They are pagans, or, in some cases, Christians, as both the Dutch and Portuguese have settlements on the island.

"We must now return to the island of Sumatra to notice three remarkable languages, spoken by people of brown colour and Malayan stock, but very distinct from the Malay.

"First in order is the Batta or Batak, which has been studied and illustrated by the grammatical works of the distinguished scholar Van der Tuuk. There are three dialects, the Toba, the Mundailing, and the Dairi. The Battas are divided into many independent States, are pagans and cannibals, but are becoming Muhammadans; yet they are not civilized, have an indigenous alphabet, and write with a twig and ink made of soot upon bark and bamboo staves, from bottom to top, the lines being arranged from left to right, but this fact, as stated by Leyden, is doubted by Marsden; they have a literature both in prose and verse. Vocabularies are not wanting, but are superseded by the works of Van der Tuuk, Schreiber, Van Asselt, and Junghuhn. The language is said by the former to be nearest of kin to the old Javanese and Tagál. Schreiber considers it to have closer affinity with Malay. The New Testament is being translated into this language by the British and Foreign Bible Society; the translation is by the Rev. Mr. Nommensen, and it is edited by the Rev. Dr. Schreiber, both Protestant missionaries.

"The next is the Rejang, described as one of the most civilized nations of Sumatra. Though pagan, it has a peculiar language and an indigenous written character of its own. They write on bamboo slips, like the Battas. Their territory is chiefly inland, and quite independent. Leyden considered the language to be an admixture of Malay and Batta. There does not appear to be much literature. The old English settlement of Bencoolen was situated in their territory. Marsden gives a vocabulary.

"The third is the Lampung. The people who speak this language live on the coast separated from Java by the straits of Sunda. The language is quite peculiar, and has an indigenous written character; one-third of the vocables appear to be original. The people are rude, partly pagan, partly Muhammadan. A vocabulary is given by Marsden, but from the year 1868—1874 Van der Tuuk has turned his attention to this language and has published several treatises, but nothing amounting to a dictionary or grammar.

"To these three tribes in the island of Sumatra may be added the

Korinchi, the inhabitants of a hitherto unexplored valley. They are Malay, Muhammadans, and speak Malay, but use a special alphabet of their own. An expedition has been fitted out this year by the Dutch Geographical Society, one of the objects of which is to penetrate into this valley. There are some savage races also, among which we have notices of the Loeboes and Oeloes by Willer and Netscher in Dutch, 1855.

"Of the language of the inhabitants of the numerous groups of islands lying off Sumatra we know little or nothing. Vocabularies are given by Marsden, and by Shortt in the *Malayan Miscellanies*, of the Nias dialect, and the Gospel of St. Luke has been translated into that idiom by the British and Foreign Bible Society. Of the dialects of the inhabitants of the Engano Islands, we have Dutch vocabularies by De Straaten and Severyn; it is totally unintelligible to the Malays; all these races are pagans, and in a very low state of civilization.

"We cross the Java Sea to Borneo, situated on the Equator, and the greatest island in the world, three times the size of Great Britain. Of the interior we know little or nothing. Crawford is of opinion, that there may be scores of tribes speaking different languages, but they are all savages, and mostly cannibals. No respectable indigenous civilization has sprung up on the island. The coasts have been occupied by Malay settlers for more than two thousand years, who in due time brought with them Muhammadanism. Bugis have settled from the East, and are of the same faith. The Javanese have made settlements and introduced Hinduism, leaving traces in ruined temples and names of places. The Chinese have settled on the northern coast. The indigenous population is pagan, and called by the generic word Dhyak. There is no alphabet, but an inscription in an unknown tongue has been found in the interior; the natives have a kind of symbolic mode of communication by notches on arrows. The greatest known tribe is the Kayan. We have a vocabulary by Burn of 800 words; Crawford gives a vocabulary of nine languages, the Kayan, Pido-Petak, Binjuk, and others. With the Muhammadan religion, the Malay language is adopted. Latham remarks that the Binjuk are maritime, and the Dhyaks landmen. The Dutch possess half the island, with a population of one million and a quarter; the Sultan of Brunei, a name identical with Borneo, the remainder; the titles to Sarawak and Labuan are both held of him. Gabelentz published a Dhyak grammar in 1852, following that of Hardeland in 1850, who also published a dictionary in 1859; there is another anonymous Grammar dated 1856: the whole Bible has been translated by Hardeland; Crawford treats of the peculiarities of the language in his *Malay Grammar*; Sir J. Brooke gives a vocabulary; Von Kessel published a glossary of the dialects of the West Coast in 1849, and Tiedke a glossary of the Sanpit and Katingan in 1872; both are in Dutch.

"To the east, and separated by the Macassar Straits, is the curiously-shaped island of Celebes, the centre of a civilization independent of Java; the population at a remote period were Hindu. The Muhammadans had only just arrived, when the Christians came on the field; a certain proportion of the people are Protestant Christians, as the Dutch power is paramount. The language and literature essentially differ from that of Java and Malay; there is a distinct written character in use, preserving the classification of the Nagari, but differing in appearance; there is also another and obsolete alphabet; there are two great languages, with a literature, the Bugi or Wugi, and the Mangkasuru or Macassar; there are other languages, the Mandhan, Buton, Salayer, Tomore, Garoutolo, and Menado, and some are spoken by savages. The Bugi are a powerful people, and their literature copious, but both languages have a soft and vocalic pronunciation. The grammar is exceedingly simple, but differing in many particulars widely from the Malay and Javanese; out of 1700 words 1300 are native, the remainder loan-words from Malay and Javanese; their language has exerted an influence upon other islands; they have an ancient literature and laws, and by some are asserted to have an archaic language, but no specimen has been obtained. The Macassar and Bugi are not dialects of the same language, though they have much in common; they are mutually unintelligible. To Dr. Matthes we are indebted for grammars, dictionaries, an essay on folklore, selections, and a translation of a portion of the Bible both in Bugi and Macassar. Vocabularies are supplied by Crawford, Thompson, Leyden, Raffles, and others; a vocabulary of the dialects of Tomore, Buton, Salayer, is supplied by Wallace, one of Menado by Latham, and of Mandhan and Buton by Raffles. The Koran has been translated into Bugi. Professor Niemann gives instruction in Bugi and Macassar in the College for Training Dutch Colonial Servants at Delft in Holland. There are several languages spoken in the Celebes by the Alfura, or Harafura, or Turajah, head-hunting savage races. We have contributions from several Dutch scholars, Janson, Rhidell, and Professor Niemann, 1866, and others. The flourishing Dutch settlement of Minahassa is in their neighbourhood. We have a translation of the Bible by Herman in one of these languages, a catechism in Malay and Alfura by the same, and materials for a dictionary by Millies. There is no written character, and indeed very little is known as to the names and numbers of these languages.

"Crossing the Molucca Passage to the east, we come to the Spice-Islands. It was here that the Portuguese were met in 1521 by Magellan and the Spaniards, who had crossed the Pacific from the west. We find that then, as now, the Malay language was the language of commerce, yet each island, Amboyna, Tidor, Ternate, Banda, Gilolo, and others, had preserved their peculiar languages totally different from Malay. There was no

kind of alphabet in the Spice-Islands: the Roman and Malay characters are now used, and the people of Amboyna are nominally Protestant Christians. In the other islands the inhabitants are pagans, with a sprinkling of Muhammadans. M. Van Hoewell, jun., has this year published remarks in Dutch on the five leading dialects of Amboyna, Sassarua, Hurunka, Nusalaut, Hila, Nazari-anpat, with a glossary. He remarks that these languages had been much neglected. Vocabularies of different degrees of fullness are available in the works of Wallace, Crawford, Raffles, Bickmore, Leyden, De Clerq, Van Edris, and other Dutch writers. It would be a mere recapitulation of names of uncertain value and number to set out the groups of letters by which the forty-two languages, mentioned by Wallace, are expressed, though there is no doubt of the genuineness and accuracy of his lists.

"Proceeding northwards we come to the Philippine Islands, a new linguistic world, and the colonies of the Spaniards. The two great languages are the Tagál and the Bisayan, but there are many hundred islands, and we need not be surprised to hear of many dialects, among which the Pampanga, Jambal, Pangasinan, Ilocos, Cagayan, Camarines, Batanes, Chamena, are the best known. The residents of the different islands are not mutually intelligible; out of a population of three millions and a half, called by the Spaniards the *Indios*, one-third speak a variety of Bisayan and two-thirds a variety of Tagál; vocabularies of about thirty exist. The Roman Catholic friars have played a great missionary and political part here, and the majority of the population is nominally Christian. One of the islands enjoys independence and Muhammadanism. Savage unsubdued tribes occupy the mountainous interior of the chief island, Luzon; some of them are *Negritos*, of numbers unknown, and all pagans. There is one indigenous alphabet, though the Spanish authors, who are not authorities in linguistic science, assert the existence of many, but produce no proofs. It is written with an iron stile on bambus or palm-leaves, and in Chinese fashion from top to bottom.

"The great feature of the language of this group is polysyllabism, and the blending of noun and verb into a single word, and the difficulty of tracing the roots of either is a cause of perplexity. The changes are most complex; perfect familiarity with every form that a word can assume, not only by addition of particles, but interchange of letters, is necessary to enable a person to detect the radix, which, according to Leyden, is more disguised than in Arabic derivatives. Nouns have no accidents; verbs have moods or tenses, but have no pronominalization to indicate number and person; the inverted sentence-construction of the passive is preferred to that of the active; the plural of nouns is formed by a particular prefix instead of an adjective following; in verbs, inseparable particles are used, instead of auxiliaries, to mark time.

"The number of synonyms to represent one idea is enormous. Crawford remarks that several of the languages have arrived at a high degree of culture, and differ greatly in structure from the Malay and Javanese. Humboldt asserted that the Tagál was the most perfect specimen, and the parent language of the Malayan family, which is, of course, denied by Crawford. We have a plentiful linguistic literature in Spanish, and Crawford describes the languages scientifically in the Preface to his Malay Grammar; but of an indigenous literature we have but an uncertain account, for it appears, that the early missionaries extirpated the original memorials of the race with pious care, supplanting the precious remains of national and pagan antiquity with hymns, church-legends, and the religious life of Thomas à Kempis in the Itonan character. Of grammar, which the Spaniards term 'Arte,' we have one in Tagál by Buyeta; in Bisayan by the same, in Pampagna by Bergnano, in Ilocos by Lopez and Bergnano. We have dictionaries or vocabularies in Tagál by De Las Santos, Noceda, Buena Ventura and Mallet; in Bisayan by Moutrida and Sanchez, in Pampugna by Bergnano, in Ilocos by Carro.

"Eighty miles across the China Sea is the island of Formosa or Taiwan, part of the Chinese empire. Its coasts and plains are occupied by Amoy-Chinese emigrants, but its mountainous interior is occupied by people of the Malayan race, the furthest eastern outwork of that great family; beyond it the Japanese dialects commence. European missionaries are now settled among this people, and Von Gabelentz, Klaproth, and Crawford have written about their language; and in later years we have essays by M. Guérin, M. Favro, Professor of Malay at the Cours Orientales at Paris, and Mr. Taintor, of the English Consular Service; vocabularies accompany the grammatical notices. There is reason to believe, that the Malayan race passed from the Philippines into this island; they are either found in a demi-civilized state given to agriculture, and are then known as Kabaran or Pepu-kwan, 'savages of the plain,' or as Yukan, downright savages of the mountains. Vocabularies of both dialects are given, and contrasted with the Tagál, Malay, Javanese Sassak, and Malagasia. They are pagans, and have never made any progress in civilization, being either in subjection to the Chinese, or in savage liberty; they have neither written character nor literature; there is an entire absence of Sanskrit words, which marks the period of the Malayan colonization to be anterior to the Hindu conquest of Java; intercourse with the rest of the Malayan race must have been very slack, and the influence of the Chinese conquest upon the language very strong.

"At a distance of many degrees to the West, separated from Africa by the Mozambique Channel, is the island of Madagascar, the most western outwork of the Malayan race. Mr. Crawford asserted that the Malagasies

were a Negrito people of African blood, with a slight admixture of the Malayan in their blood and language, from pirates or tempest-driven vessels off the island of Sumatra. Humboldt led the van in the theory of a Malayan origin; and since the island of Madagascar has become better known, and the residence of missionaries, his opinion is gaining ground. A dictionary was published by Mr. Freeman forty years ago, and indeed one by Flacourt, in French, more than two hundred years ago. An outline of a Malagasic grammar has been published by Van der Tuuk, the celebrated Malay scholar, and a translation of the New Testament. The Rev. Dr. Mullens, of the London Missionary Society, in a paper read before the Geographical Society, 1875, has expressed the latest opinion, and quotes the following opinion of the Rev. Mr. Cousin, a missionary of standing, who has been selected by all the Protestant Missions in the island to the responsible task of revising the Bible, which is being done now thoroughly, proof-sheets being sent for revision to each missionary. 'The language is one, a Malay tongue with three or four chief dialects, and an admixture of foreign words brought in the intercourse of trade.' Van der Tuuk agrees in the above, and remarks that the Malagasic is like the Toba dialect of the Batta language in the island of Sumatra, above described; that there are resemblances to Javanese, Batta, Malay, and Dhyak of Borneo; and that it must have come from the west coast of Sumatra, after an admixture with a language resembling that of the island of Nias. Certainly the words in Malagasic are very long indeed; Malay and Javanese roots are bisyllabic, and prefixes monosyllabic; while in Malagasic we have prefixes and affixes of three syllables, extending the length of some words to a monstrous extent; and it must be admitted, that the Malagasies are a dark race, speaking apparently the language of the brown races of the Archipelago. There are no Sanskrit words in the Malagasic; therefore the connexion must date back to a period before the immigration of the Hindus. The Malagasies are pagans. There is no written character, and the missionaries have introduced the Roman character, and a code of laws has been printed. According to French authorities, the Arabic character was once used, the power of the letters being somewhat modified. In addition to the books mentioned above, we have French treatises by D'Urville, Marre de Marin, and Dalmont; a grammar, by Griffiths, of the Ankova dialect; the other two dialects are the Sakalava and Betsimi Saraka; a French-Malagasic dictionary is now being published by M. Marre de Marin; there are also vocabularies by Wallace, Crawford, Challaud, Drury, and John. Owing to the intercourse with the French, a great many French words have crept in. The population is about two and a half millions, according to Dr. Mullens' careful estimate, and christianity is on the increase. It forms an independent state.

"We have thus swept into our net all the languages, which can possibly be connected with Asia, from the extreme western frontier of India up to the boundaries of China. The region is interesting, as lying betwixt two great civilizations, that of India and China, and partaking, to a certain extent, of both, but in different degrees. Here we come on the language of a great people, fully described in the Report of 1875 by Dr. Legge. South of the islands of the Indian Archipelago, which are situated on a plateau of *Shallow-Sea*, lie the *Deep-Sea* islands of the Austral Archipelago, with a plurality of languages requiring another collector and classifier. Beyond China and Japan, described this year by M. de Rosny, lie the fresh fields and pasture new of the Mongolic and Tungussic families, as far east as the distant Corea. If this harvest be in a future year garnered, it will fill up the space in Eastern Asia beyond the region of the Turkic family, which has found this year so able a reporter in M. Pavet de Courteille. To the west and north of this family lies the Ugro-Finnic family, last year (1876) reported on by M. Ujfalvy, and the Samoielic, which is not yet disposed of. On the south-west confines of Asia is the Caucasian group, furnishing an ample study.

"Original investigations have their value, and, if based upon facts and legitimate inductions, are a contribution to positive knowledge; but a grouping and arranging of such facts in a collective and popular form, and thus rendering available the sporadic contributions of many minds, has also its value; and the first step towards supplying the lacunæ of our actual knowledge is to take stock of our possessions, and indicate what is the work left to be done by future investigators.

"The papers, of which the report is composed, are original compositions of eight to ten English and foreign authors, and the information supplied will beget and render possible future special studies. To a certain extent they are more readable and attractive to outsiders than learned discussions on special subjects. It may be mentioned that the paper on *Non-Aryan Languages of India*, contained in our report of last year, has been reprinted in a Philological journal in Paris and the journal of a learned Society in Calcutta. Original views are sparingly brought forward in these reports; the statements of others are quoted for what they are worth; herein is the main difference of a popularizing report and an original research.

"The range of the Himalayas are a great linguistic watershed of a most unique and interesting kind. A profound study of the *Non-Aryan Languages of India*, *Iudo-Chinese Peninsula*, and *the Indian Archipelago* may some day furnish materials for a wider induction of grammatical principles than was possible to the limited knowledge available to Bopp, Humboldt, and Max Müller. We seem to catch the first effects of the human

race *in situ*, not in a state of hopeless savagery, as in Australia and America, but in a graduated scale of improved and improving languages. In the rear of the Himalaya is the great monosyllabic Chinese; the flank is turned by every possible combination of the Agglutinative method; in their front is the great Inflecting Word-system of the elder family of the Aryans, destined in the Vernacular to incorporate Semitic vocables. Thus from these languages may, possibly, at some future period, be gathered the connecting links between the great Orders of Human Speech."

LIBRARY.

The following additions have been made to the Library since the Meeting held in August last

TRANSACTIONS, PROCEEDINGS, AND JOURNALS, *presented by the respective Societies or Editors.*

Berlin. Die Königl. Preussische Akademie der Wissenschaften,—*Monatsbericht*, März, April, Mai, 1877.

Marz. H. C. Vogel.—Spectral-Photometrische Untersuchungen insbesondere zur Bestimmung der Absorption der die Sonne umgebenden Gashülle.

Mai. von Martens.—Uebersicht der während der Reise um die Erde in den Jahren 1874—1876 auf S. M. Schiff *Gazelle* gesammelten Land und Süßwasser-Mollusken.

Bombay. The Indian Antiquary,—Vol. 6, Pts. 70—72, 1877.

Pt. 72. Dr. Caldwell.—Sepulchral Urns in Southern India. Prof. A. Weber.—On the Krishnajanmashtami, or Krishna's birth-festival.

— The Bombay Branch of the Royal Asiatic Society,—*Journal*, Vol. 12, No. 84a, (Extra number).

G. Bühler.—Detailed Report of a tour in search of Sanskrit MSS. made in Kashmir, Rajputana, and Central India.

Calcutta. Geological Survey of India,—*Memoirs*. Palæontologia Indica. Ser. 11, 3.

Dr. O. Feistmantel.—Jurassic (Liassic) flora of the Rajmahal group from Gola-pili (near Ellore) South Godavari District.

— The Mahabharat, Nos. 10—14.

— The Rigveda Sanhita, Pt. 1, No. 2.

— The Rigveda Sanhita, Pt. 1.

— The Ramayana, Pt. 6, No. 3.

Dublin. The Royal Irish Academy,—*Proceedings*, Vol. 2, Ser. 2, Nos. 1—8, and No. 11.

No. 1. C. E. Burton.—On a Spectroscope of the Binocular Form for the Observation of Faint Spectra.

- No. 5. *A. Macalister*.—Notes on some Anomalies in the course of Nerves in Man. *Rev. T. R. Robinson*.—On the Theory of the Cup Anemometer, and the Determination of its Constants. *G. H. Kinahan*.—The Drifting Power of Tidal Currents, &c. that of Windwaves.
- No. 6. *J. L. E. Dreyer*.—On Personal Errors in Astronomical Transit Observations.
- Dublin. The Royal Irish Academy,—Transactions, Vol. 25, Nos. 10—20, and Vol. 26, Nos. 1—5.
- No. 10. *Rev. J. H. Jellett*.—Researches in Chemical Optics.
- No. 11. *B. B. Stoney*.—Report on the Strength of Single-riveted Lap Joints.
- No. 14. *A. Macalister*.—Report on the Anatomy of Insectivorous Edentates.
- No. 15. *J. G. Baker*.—Report on the Scypholles Fern Flora.
- No. 18. *Dr. W. R. McMahon*.—Experiments on the movements of Water in Plants (Pl. 2).
- Gravenhage. *Bijdragen tot de Taal, Land, en Volkenkunde von Nederlandsch-Indië*.—Volgrecks 3, Deel 10, Stucken 2—3, en Deel 11, Stucken 1—2; Volgrecks 4, Deel 1, Stuk. 1.
- Leipzig. Die Kunde des Morgenlandes, herausgegeben von der Deutschen Morgenländischen Gesellschaft,—Abhandlungen, Band 6, No. 3.
- M. Steinschneider*.—Polemische und apologetische Literatur in arabischer Sprache, zwischen Muslimen, Christen und Juden, nebst Anhängen verwandten Inhalts.
- . Die Deutsche Morgenländische Gesellschaft,—Zeitschrift, Band 31, Heft. 1, mit Register zu Band 21—30.
- J. Jolly*. Ueber die Smrititexte der Hauptindischen Handschriftensammlung. *Th. Noldeke*. Zur Erklärung der Sasanidenmünzen.
- London. The Anthropological Institute,—Journal, Vol. 6, No. 4, and Vol. 7, No. 1.
- Vol. 6, No. 4. *A. H. Kiehl*.—Notes on the Javanese. *W. J. Knowles*.—On the Classification of Arrow-heads.
- Vol. 7, No. 1. *M. J. Walhouse*.—On Non-sepulchral Rude Stone Monuments. *H. Clarke*.—On the Himalayan Origin of the Magyars.
- . The Athenæum,—Nos. 2594—2608, 1877.
- . The Geological Society,—Quarterly Journal, Vol. 33, Pt. 2, No. 180.
- Prof. A. L. Adams*.—On Gigantic Land-Tortoises, and a small Freshwater Species from the Osiferous Caverns of Malta, together with a list of their Fossil Fauna; and a Note on Chelonian Remains from the Rock cavities of Gibraltar.
- . The Geographical Magazine, Vol. 4, Nos. 7—9.
- No. 7. *T. W. Saunders*.—The Himalayan System. The India-rubber trees in Brazil.
- No. 9. *Major H. Wood*.—Note on the Drainage of the Upper Oxus Basin. *E. W. Pringle*.—Extension of the Malabar Coast.
- . Institute of Mechanical Engineers,—Proceedings, No. 2, May, 1877.

H. Kirk.—On Homogeneous Iron, and the degrees of Homogeneity to be expected in Iron produced by various systems of Puddling and subsequent working. *E. H. Carbutt.*—On Root's Mine Ventilator, and other applications of Root's Blower. *L. Perkins.*—On Steam Boilers and Engines for High Pressures.

London. *Nature*,—Vol. 16, Nos. 402—414, 1877.

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No. 180. *Dr. Norris.*—On certain Molecular Changes which occur in Iron and Steel during the separate acts of Heating and Cooling. *Prof. P. M. Duncan.*—On the Rapidity of Growth and variability of some Mollusporaria on an Atlantic Cable, with remarks upon the rate of accumulation of Foraminiferal Deposits. *G. Bischof.*—On Putrescent Organic Matter in Potable Water. *G. Williams.*—Researches on Emeralds and Beryls. Pt. 2. On some of the Processes employed in the Analysis of Emeralds and Beryls. *Dr. S. Zinger,* and *A. P. Stuart.*—On the Temperature of the Human Body in health.

No. 181. *G. J. Romanes.*—Further Observations on the Modification of the Excitability of Motor Nerves produced by Injury. *G. M. Whipple.*—On the Temperature-correction and Induction-co-efficients of Magnets. *W. De la Rue.*—On the length of the Spark from a Voltaic Battery in different Gases at ordinary Atmospheric Pressure. *J. Tyndall.*—Further researches on the Deportment and Vital Resistance of Putrefactive and Infective Organisms from a Physical point of view. *General Strachey.*—On the alleged Correspondence of the Rainfall at Madras with the Sun-spot Period, and on the True Criterion of Periodicity in a series of variable Quantities. *W. D. Niven.*—On the Calculation of the Trajectories of Shot,

——. The Royal Astronomical Society,—Monthly Notices, Vol. 37, Nos. 6—8.

No. 6. *Capt. W. M. Campbell.*—On a Peculiarity of Personal Equation. *Mr. Struve.*—Note on a Deviation of the Plumblines.

No. 7. *Mr. Penrose.*—Description of an Improved Diagram for the Graphical Solution of Spherical Triangles, applicable to the questions arising out of the Spheroidal Figure of the Earth, treated in the Paper read before the Society November 10, ult, and further illustrated by the case of the Prediction of Occultations. *M. de Boë.*—On a Method of Destroying the Vibrations on a Mercurial Reflector. *General Meig's.*—On a Method of Making a Pendulum swing in an approximately Cycloidal Arc.

No. 8. *Prof. Zenger.*—A new Solar Eye-piece.

——. The Royal Geographical Society,—Proceedings, Vol. 21, Nos. 4 and 5.

No. 4. *Buchanan.*—On the Distribution of Salt in the Ocean as indicated by the Specific Gravity of its Waters. *Carpenter.*—Lecture on the Temperature of the Deep Sea bottom and the conditions by which it is determined. *Trotter.*—The Pandit's Journey from Leh to Lhasa and return to India via Assam.

——. The Statistical Society,—Journal, Vol. 40, Pt. 2.

Dr. C. Steel.—The Mortality of Hospitals, General and Special, in the United Kingdom, in Times Past, and Present. An abstract of an Essay to which the Howard Prize Medal of 1876 was awarded.

London. The Zoological Society,—Proceedings, Pt. 1, 1877.

Sir Victor Brook. On the deer of the Philippine Islands, with a Description of a new Species.

E. W. H. Holdsworth.—Exhibition of, and remarks on, a specimen of *Geocichla Layardi*, obtained at Jaffna, Ceylon.

———. ———. Transactions, Vol. 10, Pt. 1.

St. George Mivart.—On the Axial Skeleton of the *Struthionidae*.

Munich. Die K. B. Akademie der Wissenschaften,—Mathematische-Physikalische Classe,—Sitzungsberichte, Heft. 2 und 3, 1876.

Heft. 2. *Bischoff.*—Über das Gehirn eines Orang-outan.

———. ———. Philosophische-Philologische und historische Classe,—Sitzungsberichte, Band 1, Heft. 4, 5.

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No. 2. *M. Th. du Moncel.*—De la transmission électrique à travers le sol par l'intermédiaire des arbres. *M. Pasteur.*—Note sur le charbon et la septicémie. *M. Gony.*—Recherches photométriques sur les flammes colorées. *M. S. Bern.*—Sur un nouveau métal, le *davyum*. *M. L. Fredericq.*—Sur le dosage de l'acide carbonique dans le sérum sanguin. *MM. v. Feltz et E. Ritter.*—Etude comparée des préparations cuivriques introduites dans l'estomac et dans le sang. *M. G. Sée.*—Traitement du rhumatisme, de la goutte et de divers états nerveux, par l'acide salicylique et ses dérivés. *M. H. Marty.*—Sur la recherche de l'acide salicylique. *M. A. Grellet.*—De l'usage externe de l'acide salicylique.

No. 5. *M. Faye.*—Sur la partie cosmique de la Météorologie. *M. Francois Frack.*—Ectopie congénitale du cœur. Comparaison de l'examen graphique des mouvements du cœur et de la cardiographie chez les animaux. *M. P. Bert.*—Sur le sang dont la virulence résiste à l'action de l'oxygène comprimé et à celle de l'alcool.

No. 7. *M. Th. du Moncel.*—Sur les meilleures conditions d'emploi des galvanomètres. *M. R. Wolf.*—Remarques à propos d'une communication récente de *M. Faye*, sur la relation entre les taches solaires et les variations de la déclinaison magnétique. *M. Babuf.*—Note sur le patinage des roues des machines locomotives.

No. 9. *M. Th. du Moncel.*—Sur le rapport qui doit exister entre le diamètre des noyaux de fer des électro-aimants et l'épaisseur de leur hélice magnétisante.

No. 10. *MM. B. Corenwinder et G. Contamine.*—Recherches sur l'acide phosphorique des terres arables. *M. Th. du Moncel.*—Considérations sur l'interprétation qu'on doit donner aux conditions de maxima relatives aux calculs des forces électro-magnétiques.

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Septembre, Liv. 2. *M. L. Delaporte.*—Une Mission Archéologique aux ruines Khmers.

Octobre, Liv. 3. *M. P. Merreau.*—La Politique Française en Cochinchine.

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———. Revue Scientifique,—Nos. 1—13, 2^e Série, 1877.

No. 1. *H. Spencer.*—La Science Sociale.

No. 6. La Météorologie en France, projet de réorganisation.

No. 7. *M. Berthelot.*—Les cités animales et leur évolution. L'exploration des chemins de fer.

No. 9. Association Française pour l'avancement des Sciences. Congrès du Havre.

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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR DECEMBER, 1877.

The Monthly General Meeting of the Asiatic Society of Bengal, was held on Wednesday, the 5th December, at 9 P. M.

Major-General H. L. TRIVILLIER, R. A., C. S. I., Vice-President, in the Chair.

The following presentations were announced :—

1. From H. Blochmann, Esq., a copy of the *Maqámát-i-Badí'-i-Hamadání*, lately lithographed at Lucknow.

2. From J. McCrady, Esq., a copy of the following papers read before the Elliot Society :

Description of the Oceanic (*Turritopsis*) *Nubricula*, N. S. and the Embryological History of a singular Medusan larva, found in the cavity of its belt.

Gymnophthalmata of Charleston Harbor.

3. From the Trustees of the British Museum the following books : Description of Ancient Marbles, Pts. I to XI, Catalogues of Fossil Reptilia of South Africa, British *Hymenoptera*, British Fossil Crustacea, Birds, Typical specimens of Lepidoptera Heterocera, and a Guide to the Exhibition Rooms in the Departments of Natural History and Antiquities.

The following gentlemen, duly proposed and seconded at the last Meeting, were balloted for and elected ordinary members—

Dr. Krishna Dhán Ghose.

L. Mandelli, Esq.

The following are candidates for ballot at the next meeting—

1. Lieut. H. A. Sawyer, B. S. C., Military Department, Calcutta, proposed by Captain J. Waterhouse, seconded by H. Blochmann, Esq.

2. Alexander Ward, Esq., M. B. C. S., proposed by Dr. J. M. Foster, seconded by H. Blochmann, Esq.

The CHAIRMAN announced that Dr. Wise had compounded for his subscriptions by the payment of Rs. 230, and Mr. Alex. Grant, on payment of Rs. 332.

The CHAIRMAN said—

It would be in the recollection of Members of the Society that at the Meeting in November last year the Society sanctioned a proposal of the Council for the demolition of the present boundary wall in Park Street and the erection in its place of a dwarf wall and railings, with two gateways and a durwan's lodge, at a cost of Rs. 4,400. Arrangements were accordingly made for putting the work in hand, but the Council found some difficulty in selecting any really suitable railing for the site within the cost sanctioned. Meanwhile it was ascertained that the Municipality desired to obtain a slip of the Society's ground to improve the approaches of Park Street. In this view, and as one of the principal objects of erecting a railing was to beautify the approach to Park Street, it was thought that the Municipality, on receiving the ground required, would be willing to bear part of the expense of putting up the new railings, and with their help a handsome railing could be put up at a less cost to the Society than an ordinary railing would have been.

Informal proposals made to the Chairman of the Municipality on this basis were favourably entertained by him, and the Engineer of the Corporation was instructed to prepare a design and estimate for the railing and gateways required by the Society.

On the 20th August the Secretary of the Society received a note from Mr. Metcalfe forwarding copies of a very handsome design for the railing, and stating that its estimated cost would be Rs. 9,870 of which the Municipality would pay Rs. 2,000.

As the share of the expense, amounting to Rs. 7,870, the Society was thus expected to pay, was considerably in excess of the sum sanctioned, it was represented to Mr. Metcalfe that the Society could not possibly afford so much, and it was hoped that a less expensive design could be fixed upon.

In September last, when Park Street was under repairs and arrangements had already been made by the Municipality to widen the roadway by narrowing the footpath, the Municipality were anxious to take immediate possession of the strip of land required to widen the footpath, and the Secretary to the Corporation wrote stating that the Commissioners had under consideration certain proposals for improving the entrance into Park Street from Chowringhee, and forwarded a plan showing a strip of land belonging to the Society, which the Commissioners wished to purchase. The size of the strip was estimated at 8 chittacks and its value at Rs. 255/9, at the rate of Rs. 500 per cottah, but as the Commissioners wished to have

possession of the land at once, they were willing to pay 15 per cent. on the Surveyor's valuation, or say, Rs. 800 for the strip. They further undertook to pull down the wall and purchase the rubbish for their roads, temporarily putting up a wire fencing to prevent encroachments on the grounds of the Society.

Before submitting this letter to the Council, the Secretary wrote to Mr. Turnbull, to the effect that if the Municipality wished to acquire the land and demolish the wall, they must, in addition to the value of the land, give compensation to the Society for the damage done to the wall and gateway at least equal to the cost of replacing them, roughly estimated at Rs. 1,500. This the Municipality declined to do, as they considered the terms offered very fair because the wall &c. had already been condemned.

On this correspondence being referred to the Council they resolved, in order to endeavour to settle the question which had been long pending, that they would not sell any land belonging to the Society, but if the Municipality wished to improve the site at the corner of Park Street by widening the roadway, and would replace the present boundary wall of the Society's premises by a handsome railing with two gateways and a durwan's lodge, the Council were willing to give the strip of land required to widen the roadway, together with a money payment equal to half the cost of putting up the railing, up to a limit of Rs. 8000. This proposal was communicated to Mr. Metcalfe, who said he would be unable to accept it because the Finance Committee of the Corporation would object on principle to giving money for the railings, and he proposed as an alternative—

(a.) That the Municipality remove the present wall at their own expense.

(b.) That they pay the Society for the value of the materials removed.

(c.) That the Municipality put up a seven-strand neat twisted wire fence with iron standards, properly stretched, with two gates. The work to be neatly done and painted.

These propositions were declined by the Council because they felt that if the Municipality wished to acquire ground for a public purpose, they were bound to give the Society at least the compensation to which they were entitled under the Land Acquisition Act, comprising the value of the land plus 15 per cent. and full compensation for all damage or loss caused by the demolition of the walls, especially as the object for which the Society was willing to cede a portion of its land to the town would not be gained, and the whole burden of putting up the railings would thus be thrown upon the Society.

Since this reply of the Council no further steps have been taken in the matter, nor have any communications been received from the Municipality on the subject, but the Council hope that an arrangement may soon

be come to which will result in the long-desired improvement being carried out.

The Chair was then taken by the President, the Hon. Sir E. C. BAYLEY, K. C. S. I.

Mr. R. S. BROUGH read the following note on Professor Graham Bell's Telephone—

Prof. Graham Bell's Telephone.

With the aid of the report of the admirable description of Prof. Bell's Telephone, given by Mr. W. H. Preece before the meeting of the British Association at Plymouth, and of the excellent papers recently published on the same subject in "Nature," the "Engineer," and "Engineering," we have been enabled to make up a few for experimental purposes in the Telegraph Workshops at Alipore; and, as I have no doubt many Members of the Society are anxious to make themselves practically acquainted with these most ingenious instruments, I have ventured, at the instance of the Honorary General Secretary, to place a pair before you this evening.

Before proceeding to illustrate practically the working of the Telephones, it will perhaps be generally acceptable if I give a brief preliminary explanation of their principle and construction.

I will follow Mr. Preece in recalling to mind the fact that the character of a musical note, that is of a sensible periodic sound, is determined by its condition with respect to three qualities, namely, *pitch*, *timbre*, and *intensity*.

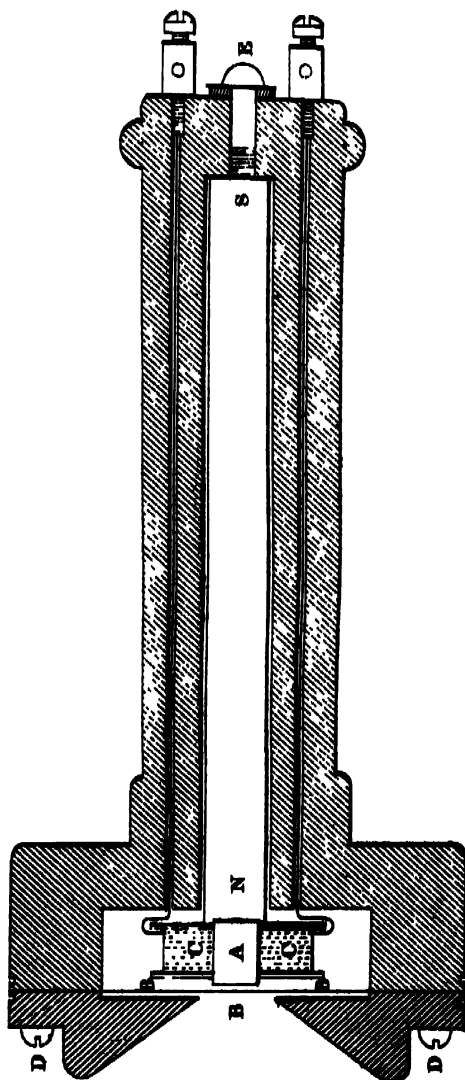
The *pitch*, increasing as the period of the note diminishes, will vary directly as the number of vibrations per unit of time.

The *timbre*, as Helmholtz has shewn, depends on the harmonics of the fundamental simple vibration, which are present.

While the *intensity* increases and diminishes with the amplitude of the vibrations.

Theoretically speaking, the transmission of different notes, in so far as regards only their different pitches, by means of electricity is a comparatively simple thing. We have only to arrange so that when we sound the note to be transmitted at, what in Telegraph parlance I shall call, the "sending station," its vibrations shall be communicated to a moveable conductor, which shall make and break contact between a battery and the line with the precise frequency of the vibrations it takes up. Thus for each contact made, a current will be sent to the line; and a series of periodic currents will be received at the distant station, the length of whose period will depend on the pitch of the note sounded at the sending station. These

PROFESSOR GRAHAM BELL'S TELEPHONE.



FULL SIZE

Engraved at the Surveyor General's Office Calcutta.

periodic currents being made to operate, a suitable receiver (electro-magnetic, as in Reiss's: or electrostatic as in Varley's) in the distant station will there reproduce a note of precisely the same pitch as the note originally sounded in the sending station.

By this arrangement each contact made in the sending station will transmit a current of definite magnitude, depending on the strength of the battery employed. All the current waves thus sent to the line will be precisely similar, and the only way we can modify them is in regard to the rapidity with which they follow one another.

Hence the note reproduced in the distant station will represent the original note in pitch only; the fundamental vibration will be the same, but bereft of all its harmonics. Any characteristic timbre the received note may possess will be entirely due to the nature of the receiving apparatus, and not in any degree to that of the sending apparatus.

Such, in its main features, was the Telephone of Reiss—a mere “tone” Telephone, reproducing the pitch, but losing the timbre. It is noteworthy that in such a Telephone, the intensity of the received note is entirely independent of the intensity of the original note. So long as the original note is strong enough to efficiently work the battery contact, we can, within certain limits, vary the intensity of the received note at pleasure, by varying the strength of the battery employed.

Now the Telephone before you not only conveys the pitch, but also reproduces the timbre with such exquisite accuracy, that a known voice is at once recognized by the ear. Moreover, it is not only sensible to musical tones, clang-tint and all, but to any noise, so that it is essentially a “sound transmitter.”

To facilitate the comprehension of the construction of the instrument, I have had a large-scale section drawn. *NS* is a hard steel rod, permanently magnetized. (See Plate III.)

A is a short piece of soft iron, of somewhat smaller diameter than the rod, screwed in to its end *N*. *A* becomes magnetized by induction, so that virtually *AS* forms a single magnet.

B is a circular elastic diaphragm of soft iron about four thousandths of an inch thick.

CC is a narrow circular coil, of the thinnest silk-covered copper wire, surrounding the iron core *A*.

DED is a light cylindrical wooden case.

The magnet *NS* is fixed to the wooden case by means of a screw at *E*.

The diaphragm *B* is fixed to the wooden case at *DD*.

The hollow part of the case surrounding the coil *CC* acts as a resonator.

This constitutes the whole apparatus. The apparatus in the sending

and receiving stations are precisely similar. We have simply to connect the one end of the coil of wire in each station to the line wire, and the other end to the return wire or to earth.

The currents are produced magneto-electrically at the sending end of the line, and are received electro-magnetically at the distant end.

Now returning to the figure we see that we have a soft iron induced magnet, *A* surrounded by a coil of wire *C*, and opposite the end of the soft iron core *A* we have the soft iron diaphragm *B*.

Lines of magnetic force radiate away from the core *A*, some towards the disc *B*, others away from the disc towards the distant end *S* of the permanent magnet. These lines of force penetrate through the coil of wire *C*.

So long as the disc *B* remains at rest, the lines of force emanating from *A* remain stationary; but if the disc *B* be moved in towards or out from *A*, the lines of force will increase or decrease in number and will change in direction.

When the lines of force move, they cut the convolutions of the coil of wire *C* at right angles. Now we know that if we move a conductor across the lines of force in a fixed magnetic field, or, what is the equivalent, as in this case, move the lines of force across a fixed conductor, an electromotive force is produced in the conductor.

Hence in this case, motions of the disc *B* will produce electromotive forces in the wire of the coil *C*.

In fact, if we attach the ends of the wire of the coil *C* to the terminals of a sensitive galvanometer, and press the disc *B* in with our finger, we shall see a throw of the needle in one direction, indicating a transient current through the galvanometer. Holding the disc *B* pressed in until the index of the galvanometer comes to rest, and then releasing it, we shall see a throw of the needle in the opposite direction, indicating a transient current through the galvanometer in the reverse direction to the first. (Mr. Brough showed this experimentally with a Thomson's Reflecting Galvanometer.)

The relative direction of the current is in each case, according to Lenz's Law, which is only a statement of a particular case of the general Law of the Conservation of Energy, such that the magnetic field it produces tends to resist the motion impressed on the diaphragm *B*. Knowing the polarity of the permanent magnet *NS*, we can at once infer the absolute direction of each current from Ampère's Rule.

When we press the diaphragm in, we have to do work. Part of the work thus done takes the form of the potential energy of the bent diaphragm, while the other part takes the kinetic form of the transmitted electrical current. When we release the diaphragm, it returns to its initial

position, in virtue of its elasticity, and its potential energy is converted into the kinetic form of an electric current transmitted in the reverse direction to the first:

The magnitude of the electromotive force produced in the coil will be proportional to the number of lines of force cut through per unit of time; and will, therefore, be clearly proportional to the rate of displacement of the diaphragm *B*, and thence to the energy of the impact we impress on the disc *B*.

Small impacts will produce small electromotive forces: large impacts large electromotive forces.

Moreover, the inertia of the diaphragm is so small, that it is always ready to receive fresh impressions, which will be simply super-imposed on those already existing.

Lastly, the iron core *A* being so short relatively to its diameter, and being initially so highly magnetized, readily receives and loses the small accessions of magnetism to which it is subjected.

The result of all this is, that variations of pressure on the disc *B* will always give rise to electromotive forces proportional to their magnitude.

Thus if we sound a note in front of the disc *B*, not only will it impart its fundamental vibration to the disc, but also the subsidiary vibrations representing its harmonics.

Hence, not only will a principal periodic electromotive force, corresponding to the fundamental vibration of the note, be generated in the coil *C*, but also minor electromotive forces, corresponding to the harmonics.

And, finally, not only will a series of principal current waves, corresponding to the fundamental vibration, be sent to the line, but on their contour will be impressed the minor undulations of electrical potential representing the timbre of the original note.

The action of the apparatus in the receiving station will be at once apparent. There, the received currents flowing through the coil of wire, in their turn re-act on the diaphragm *B*. The diaphragm, like the mirror of Thomson's Cable Galvanometer, has no fixed zero, but is ready at every moment to follow each wave. The motion of the diaphragm sets the air in vibration, and reproduces the original note.

The sensibility of the apparatus as a receiving instrument is extraordinary. Certainly the *strongest* current with which it is at any moment worked does not exceed $\frac{1}{1,000,000,000}$ of the centimetre-gramme-second unit current. The current with which our relays are worked in India is 400,000 times as strong.

The practical objection to the instrument in its present form is that the forces concerned are so microscopic. The consequence is that the

sound produced by it is feeble; and that its action is easily interfered with by induction. It is impossible to employ it on one of a number of over-land wires, while the other wires are being worked in the ordinary way, on account of the induced currents; but a sub-marine line is free from this source of disturbance, and Mr. Preece informs me that the Telephone has been successfully worked through 60 miles of cable: I believe between Dartmouth and Guernsey.

Professor Bell has himself explicitly stated that he has not brought forward his Telephone in its present form as a perfected instrument; but because it has reached a stage of great theoretical interest, and one not altogether destitute of practical applicability. He, and his co-adjutors in Boston, are still labouring to perfect it.

In speaking through the Telephone, we should not shout, for shouting tends to stress the diaphragm to its maximum, where its sensibility is least, and sounds may easily be lost. The great point is to combine a sufficient strength of voice with clear and deliberate utterance.

After the reading of the paper, Mr. Brough gave a practical demonstration of the working of the instrument. With the kind permission of the Surveyor General, communication had been made between the Society's Rooms and the Observatory at the Surveyor General's Office, a distance of half a mile, and the sounds of the voice, whistling and a musical box were successfully transmitted between the two points.

Mr. BLOCHMANN exhibited rubbings of the following Persian inscriptions, which were received from Mr. H. James Rainey, Zamindár of Khulná, Jessore.

I.

"This rubbing," Mr. Rainey states, "is taken from a slate slab, which is placed on the west side of the interior of a large well, situated a short distance beyond the southern gateway of the Munger Fort, and to the south-west of the Station Racket Court, on one side of which building is a Bath, to which the well supplies water." (*Metre, short Hazaj.*)

بعد دولت مخصوص خانی • که باردا تا ابد دور بقایش
بنا گردید نهسر باغ جائی • که جاو باغ شد دلکش ثنائیش
زهجرت در هزار و هفتادین سال • مرتب شد بنای دیر پایش
چو جاو و جاو در صورت یک بود • فزود آن باغ را جاو لجاایش
شدش تاربخ چاه باغ در دهر • فزون آمد ز چاه باغ هایش

1. During the time of the rule of Makhshús Khán—may it last for ever!—

2. The aqueduct of the garden was made in a way that the grandeur of the garden is his (or its) pleasing praise.

3. In the year 1007 of the Hijrah this longlasting building was erected.

4. As the words چا 'grandeur', and چا 'a well' have the same form, the grandeur of the garden increased by it (the well).

5. Its chronogram lies far ever in the words *chāh-i-bagh*, 'the well of the garden,' but the letter *he* in it is to be left out.

Adding up the letters of *chāh-i-bagh* and subtracting five for the *he* to be omitted, we get 1007 H., or A. D. 1598-99.

Regarding Makhsús Khán, *vide* Aín translation, Vol. I, p. 388. He is the founder of 'Makhsúsábád', the *Muxadavad* of our old maps, which name was subsequently changed to Murshidábád by the famous Murshid Qulí Khán.

II.

• "The second rubbing", Mr. Raincy writes, "is taken from a slate slab, lodged over the centre eastern door of a Mosque House, now occupied by Mr. A. V. Roberts, District Engineer (who gave me these rubbings) and owned by C. Aguilar, Esq. This house faces the Racket Court on the southern side, and is divided from it by the large public road running there east and west."

افضل الذكرا اله الا اله محمد رسول الله • بناء مرزاني ولي بيگ كولابی بوقت
لعل معمار • نهاده بناء مسجد پهنزار و هفتاد و چهار •

The best praise is—'There is no God but Allah, Muhammad is Allah's prophet.'

The building of Mirzání Walí Beg of Koláb, under the direction of Lál the architect. The building of the mosque took place in 1074 [A. D. 1663-4.]

The rubbing has مرزانی *Mirzání*, instead of میرزا *Mirzá*. The Dictionaries do not give the word.

The inscription spells معمار *ma'ammár*!

Dr. RĀJENDRALĀLA MĪTRA exhibited a copper plate inscription lately received from Mr. W. R. Davies of Bhāgalpur. The plate measures 15·5 × 7·7 inches, and has on the top a cast copper seal, six inches high. The name on the seal is that of Nārāyanapāla Deva, and the legend over it is the Buddhist wheel of the law, mounted on a pedestal, and supported on the two sides by two deer. Below the name is a sprig with two leaves and a flower. The inscription on the plate is in a modified form of the Kutīla character, and extends to 29 lines on the front, and 25 on the reverse, side. Its language is Sanskrit, and its purport the grant of a village named Mukutika for the use of Śiva Bhaṭṭāraka and his followers. The grant was made on the 9th of Vaisākha, in the 17th year of the donor's reign, when he was encamped at Mudgagiri, modern Monghyr. The document was composed by his minister Bhaṭṭa Guravo, the same who recorded the Buddal inscription noticed in the volume of the Journal of the Society, and engraved by Madghadāsa, son of Subhadāsa.

The genealogy of the donor begins with Gopāla, the same whose name occurs in the Monghyr plate translated by Wilkins (*Asiatic Researches* vol. I. p. 128.) He had two sons, Dharmapāla and Vākpāla, who successively succeeded him. The last appears under the name of Devapāla in Wilkins' plate. His sons were Devapāla and Jayapāla who seem to have reigned one after another. The son of the last was Vighrapāla, who married Sujjā, a daughter of the Haihaya race, by whom he begat Nārāyanapāla. A transcript and a translation of the document will be published in the next number of the Journal.

Dr. RĀJENDRALĀLA MITRA also submitted three large bricks brought by him from one of the arches of the great Temple at Buddha Gayā. Two of them were shaped like voussoirs, having the upper side longer than the lower, and the sides curved to correspond with the curve of the arch. The upper side measured 16 inches and the lower 15 inches, the breadth being 9 inches. The third was a perfect parallelogram, 15 × 9. In presenting them he gave a short account of a tour he had recently made in the Gayā district in search of antiquities, and of his researches at Buddha Gayā. He said that at the beginning of the year the king of Burmah had deputed two persons to repair the Buddhist temple at Buddha Gayā, and these persons had for some time carried on their work, when in June the circumstance was brought to the notice of Government, and he was requested to go to Buddha Gayā, and report to Government as to what should be permitted in the way of repairs, so as not to mask or modernise the old monument. When Dr. Mitra came to the place in September last, he found the Burmese gentlemen had already cleared an area of about 250 × 230 feet around the great temple, dug out the foundations of the surrounding buildings for bricks, levelled the ground with rubbish, raising thereby the level by nearly five feet, removed the old granite pavement, reset it on the higher level, demolished the pavilion of the Buddhapad, which had stood in front of the temple, built a new retaining wall to the west of the platform round the sacred Bo Tree, and enclosed the cleared area by a new wall. They had also destroyed the stucco ornaments and mouldings in the interior of the sanctuary and covered the walls with plain chunam plaster. Under the circumstances Dr. Mitra could not trace the locale of the several buildings which Hiouen-Thsang had described as standing round the temple. By a careful study of the mouldings still existing on the exterior of the temple he had prepared restored drawings of the southern and the eastern façades of the temple, and suggested to Government that the repairs may be permitted according to the drawings. The drawings were exhibited to the meeting as also a large collection of sketches of the various objects of antiquarian interest which he had met with in course of his tour. He also announced that he had collected 85 pieces of sculptured stones at Buddha

Gayá, a part of which he had suggested should be presented to the Society. Among these stones there were several pillars, rails and coping stones of the old Aśoka railing round the temple. One of the stones bore a large inscription in the Lát character of the 3rd century, B. C., and another in the Gupta character of the fourth century A. D.

Adverting to the arches which he was the first to bring to the notice of the public, Dr. Mitra said that there were altogether eleven arches in the temple, four over doorways, two over passages leading to the sanctuaries, and five forming vaulted roofs. Seven of these were pointed Gothic, and four semicircular. They were built of well-dressed bricks, shaped like voussoirs, and set in clay cement. The bricks were set lengthwise, touching each other by the ends, and not side by side as is usual in the present day. This arrangement, conjoined with the defect in the cement, made the arches weak; but they were true radiating arches, i. e., a series of blocks so formed as to fit in and disposed in the line of a curve, the blocks supporting each other by their mutual pressure, and the entire structure supported at the two ends resting on piers and not horizontal ones, formed of projecting bricks which were so common in India in former times. When Dr. Mitra first saw the arches in 1864, he had only two hours to devote to the examination of the ruins, and he then thought that they were synchronous with the shell of the temple. But further and more careful examination had now convinced him that the temple had originally been built without any arches, the opening in front having been closed by gradually projecting bricks, which left a very high triangular opening, very like what was now to be seen in the old temple at Konch. The object of this opening was to throw the sunlight at dawn on the sacred image in the temple. It was, however, found exceedingly inconvenient, as it brought in the rain-water, which deluged the sanctuary. The interior was therefore divided into three storeys, by building two vaulted roofs, and the entrances were arched over, and provided with floors. This, however, was done before the seventh century, for when the Chinese traveller Hiouen-Tsang, visited the place in 637 A. D., he found the different storeys and the pavilion in front, which stood over a vaulted roof, and described them in detail. He said they had been built after the temple (*ex suite*) but did not give any date. General Cunningham accepted the opinion of the Chinese traveller, and believed that the arches had been built long before the 7th century. Concurring in this opinion, Dr. Mitra observed that the fact would inevitably lead to the conclusion that the arches had been built by the natives of India without any aid from foreigners. Had they learnt the art of building arches from the Western nations the Persians, Greeks or Romans, they would have for certain reproduced the foreign model, and arranged their bricks in the same order in which those nations did, and used the same cement which their teachers did. But they

did nothing of the kind. They arranged their bricks in the order they thought best, and that was decidedly inferior. They knew the use of surki and chunam cement, and used it extensively in forming mouldings and images, and on their roofs and copings, and had they seen it used by the Persians or Greeks in the construction of the arch, they would have followed the example; but they did not, depending entirely on the strength acquired by the shape of the bricks, and the lateral pressure of their voussoirs. One important element in an arch was the key-stone. In the foreign models this is placed in the centre of the arch; but the Hindu or Buddhist builders had apparently never seen this arrangement, and, following their own idea, placed it on a side of the centre, wherever the exigencies of their mode of building rendered it most convenient. Taking these facts into consideration Dr. Mitra was disposed to maintain the opinion which he had expressed on a former occasion that the arches were both in conception and execution purely Indian.

Mr. H. F. BLANFORD said that the question of the arch in the Budh Gayá temple had been very fully discussed at more than one meeting of the Society about 1864, and his recollection was, that it was generally agreed by competent judges, that the apparent arch in question was not structurally an arch at all: besides which, it was of much later date than the body of the building. These conclusions did not seem to be invalidated by Dr. Rájendralála Mitra's present description.

The PRESIDENT said:

The Society is indebted to Dr. Rajendralal for his luminous statement as to the arches at Budh Gayá. Whatever may be their actual age, he has at least made it clear that they are an addition to the building long subsequent to the date of the original structure.

Nor can they be, as he has demonstrated, termed true arches. It seems to me very clear that the idea which they exemplify is derived from the wells built of bricks forming a segment of a complete arch, such as are found at any Hindu ruins of an early date, such a wall round on its side would give an example of a double arch just like those of the Gayá temple. In short, the Gayá arches may be described not as arches, but as structures showing progress towards the discovery of the true arch.

Mr. H. F. BLANFORD read extracts from three letters from Mr. S. E. Peal, of Sapakati in Assam, relative to pot-holes, to the geological structure of Goalpara Hill, and to Mr. Peal's observations on the movements of the clouds in Upper Assam. The first passage was written with reference to the discussion of Dr. Feistmantel's paper on 'pot-holes,' which took place at the meetings of the Society in March and June. Mr. Peal writes,—“I see Dr. Feistmantel has been treating us to a disserta-

tion on 'pot-holes' and doubts whether your statement that they are exceedingly common, is correct. From a boy I can remember them, and was never particularly aware that any other explanation than running water, sand and gravel was necessary. Out in India, here in Assam, I find them almost the only common characteristic of the water-worn forms. I do a good deal of Rob Roy canoeing in cold seasons, up the gorges of the rivers coming from these Naga Hills, and so have ample opportunity for studying them (if necessary). On one occasion up the Tankuk river, at a place where a bed of sandstone crosses and causes a fall of some 10 feet, large surfaces are exposed in the dry season; and the surface of the rock is full of pot-holes. I once caught thirteen good large turtle, each in a hole, head downwards; some wet sand and gravel at the bottom kept them from being quite dried up by the sun. Holes two and three feet deep—quite round and nearly vertical.

At another fall, I, one day, saw the spray flying back and upwards in such a peculiar manner, that I went over and examined closely, and discovered it was simply millions of small fish, 4 and 6 inches long, all trying to jump the fall, up stream, and that a tolerably large pot-hole was half full of fish, which served for the supper of our camp. * * * Up the Disang F. R. Mallet and I saw some curious sections of pot-holes, in a large mass of exposed sandstone. The holes were pretty close, and of sizes from 6 inches to a couple or three feet in diameter, and from 5 to perhaps 8 or 9 feet deep. They may have been more, as they ended in deep water."

The next passages read, refer to *Goalpára hill* and are as follows:—
 "I see the Glacier question is on the tapis. I have been trying to convince Mallet that *Goalpára hill* is a moraine. Seeing that *Goalpára hill* is only about 500 feet* above sea-level, I am afraid Mallet won't be convinced. The hill has large, angular, grey, metamorphic blocks, lying on the surface, and bedded in contorted gravel and sand; no bedded rock above on the hill." "I stayed on it for over a fortnight in 1873, and it was while watching excavations for gravel near the top, that I had my attention first roused by the extraordinary colour and curvature of the sands, embedded in layers; * * * some beds of sand dark rose colour, white, yellow, brown, and even bluish grey, contorted, and having coarse gravel and small blocks of stone here and there. * * * I don't know much about glaciers but the formation was so peculiar, I noted it well at the time. I found no scratched stones, but the big blocks on the hill, more or less angular and partially embedded, are hornblende,—so Mallet says, after I had sent him some pieces. Where this hornblende came from, I cannot guess. The hill is

* It is less. The Meteorological Observatory which is on the top of the hill is 386 feet only above sea-level, and 249 feet above the highest flood level of the river:—
 H. F. B.

gravelly, all through seemingly; and rests on sandstones, bedded and seen on the level of the river,—and not above, as far as I can see. How these great blocks of dark grey rock got up on the hill top was the puzzle to me. They seem scattered about on its surface, top and sides; and the hill is isolated, not overhung by any higher land. * * * The blocks of hornblende are probably up to 4 or 5 tons, now and then, and both isolated and grouped; quite irregular and more or less angular. They seemed to me like the blocks carried along a glacier surface. However, it may, after all, be easily soluble by some other means, and not need a large glacier to account for it. * * * These gravelly hills are not common in Upper Assam, which is a dead flat; not a stone of any sort to be seen."

Mr. BLANFORD said that the sketches of contorted and coloured sands which Mr. Peal had sent, certainly reminded one much of certain superficial deposits of the English river valleys, which were attributed to the action of ice. But he was hardly prepared to accept the idea of a great glacier filling the Assam valley, without very much stronger evidence. If the structure described be really due to ice action, it would demand a change of climate of less magnitude, to suppose that the deposits were due to river ice in winter. Perhaps a climate which admitted of glaciers in the Nāga hills down to 4,500 feet, as described by Major Godwin-Austen,* might also admit of river ice, in winter, within 500 feet of the present sea-level.

The last extract read had reference to the drift of the clouds in Upper Assam. Mr. BLANFORD said that he had suggested this class of observations to Mr. Peal, with a view to verifying the suggestion made in a paper on the Physical Explanation of the Inequality of the two semidiurnal Barometric Tides, published in the 45th volume of the Society's Journal; viz., that there was a flow of air in the day-time from over the valleys, to the mountains on either side, and a return flow at night. Mr. Peal writes—"About winds, I can tell you that I have pretty steadily had my eye on the clouds, upper and lower, since your last, and am still more struck than ever, with the remarkable regularity of the flow and counter-flow. The night winds (if any) travel steadily and slowly from the SSW. or WSW. (within three points) and do not change till 9 or 9½ A. M. when a counter-current sets in from the very opposite point, say NE. to NNE. This continues more or less all day, as a surface and upper wind, but I can see no trace of a wind to or from the hills, and never remember to have noticed such a wind, except in squalls, and I am pretty near a good mass of hills that should shew any thing of the kind. Our worst squalls are from the NW. * * * * As the cold season comes on, I find the NE. wind begins earlier. It is, at times, now seen at 8 A. M. but *seen* above and not *felt* below where all is still and under a dense fog. As the sun rises, the latter di-

* Journ. As. Soc. Bengal, Vol. xlii, Part 2, p. 209.

pates; but not till say half-past 9, does the air below move, so as to be felt as a light breeze, which freshens till say 11 A. M. and remains till 2 P. M. when it dies off slowly, and all is still, till the light evening or night air again set in from SW. to WSW., the two winds being hardly from opposite points; they are more like this [sketch showing the directions to be NNE. and WSW.]. I will keep this question of the winds in view as the season goes on, and, ere done with it, may mention, that in arranging houses, such as lines, godowns, &c., we generally place them so as not to be in the NE., SW. direction more than we need or are obliged to."

On the above passage Mr. BLANFORD remarked "Mr. Peel's observations then, do not confirm the idea of a diurnal interchange of the upper strata of air between the mountains and the valley, but they show a very decided movement towards the sea in the day time, with the reverse at night; such had been indicated in the case of Calcutta in the discussion of the anemometric records;* and, as regards the higher cloud-bearing strata, had been established by frequent observations on the movement of the clouds over the same place. That such a movement takes place, as a general law, had been indicated, on theoretical grounds, in the paper above referred to, and, in a subsequent paper read before the Society at the meeting in March last, it had been adduced in explanation of the alternation of land and sea breezes on coast lines. It was nevertheless extremely interesting to find that this diurnal oscillation of the winds was so regular and well marked, far up in the interior, viz., in Upper Assam. Of course so general a movement must, in a great measure, mask any mere local movement, such as that between valleys and mountains; (supposing the latter to exist). Within the last few days, another very interesting observation on this outflow of the atmosphere from the land to the sea, above the diurnal sea-breeze, had been made in a balloon ascent at Bombay, by Mr. Simmons Lynn; an account of which has appeared in the newspapers. On ascending at Bombay at 4h 40m. in the afternoon the balloon was first carried by the sea-breeze to the S. East, but having attained an elevation of 5000 feet was carried off by the upper current slowly to N. W. This observation is of great interest as assigning a datum for the vertical thickness of the sea-breeze current.†

* Indian Meteorological Memoirs, Vol. I, p. 12.

† The following is the account of the aeronaut published in the 'Englishman' of the 30th November, extracted from the 'Times of India.' In two minutes from the time of starting, (at Lal Bâgh gardens on the Parell Road, Bombay) I found myself at an altitude of 3000 feet. I proceeded at this elevation in a course S. E. by S. about 3 minutes, and determined, if possible, to continue in this direction across to the opposite shore, but I was doomed to disappointment. When I had reached about one-third across the surface of water in the line above given, the gas rapidly expanded and fully

Mr. H. B. MEDLICOTT said he scarcely liked to bring forward only current observations of his own as against the more deliberate observation of another; but, as the point at issue was of such importance he would not withhold the suggestion he had to make. On his way to Upper Assam in 1865, he stopped a few hours at Goalpára and made some notes upon the little hills upon which the station is built. He then had a first opportunity of observing to how great a depth and how completely the gneissic rocks become decomposed, even on steep hill sides, when protected from denuding action by very dense vegetation. The resulting clay might readily be taken for a deposit; and the undecomposed harder spheroidal masses of granitoid gneiss, that often remain quite unaffected, have all the appearance of boulders. But he particularly recollected puzzling for some minutes over what seemed a contorted layer in the clay. He had, however, to conclude that it was the remains of a string of quartz in contorted schist, all the rest having become reduced to earth. It was in fact this observation that convinced him of the true nature of the clay covering these low hills.

He did not pretend to say that Mr. Peal's observation and his own referred to the same features, but the possibility of its being so was sufficient excuse for recording his note.

Owing to the lateness of the hour the papers could not be read, but with the consent of the meeting the following were taken as read.

1. *Memorandum of the diurnal Variation of atmospheric Pressure at the Sandheads*, by CHAS. HARDING, Esq., with a prefatory note by HENRY F. BLANFORD, *Meteorological Reporter to the Government of India*.

This paper will be published in the Journal, Part II.

2. *Catalogue of the recorded Cyclones in the Bay of Bengal up to the end of 1876*, compiled by HENRY F. BLANFORD, Esq., *Meteorological Reporter to the Government of India*.

This paper will be published in the Journal, Part II.

distended the flaccid portion of the balloon. This caused her to ascend very rapidly to an altitude of 7,500 feet, but I found that my course was reversed to NW, and I was leaving Bombay at a considerable speed towards the Arabian Sea. * * * I discharged a sufficient quantity of gas to descend to an elevation of 5000 feet. Then I found myself exactly balanced, with the car in one atmosphere and most of the sphere of the balloon in another. The balloon at this moment ceased to revolve on its vertical axis, one side, that towards the East, being very cold, and that towards the West much warmer. I now descended to an elevation of 4000 feet, and proceeded in a northerly [sic] course, but just by way of experiment I re-ascended to 5000 feet and found that the balloon was again making for sea in a North-Westerly course, exactly at the same altitude as before. * * * I continued the descent and found I was proceeding very slowly in the same course as at first."

3. *Contributions to the Geography and History of Bengal. No. IV.—By*
H. BLOCHMANN, M. A.

(Abstract.)

The essay notices the following points :—

(a.) *Inscriptions.* The Society has received from Maulawi Sayyid Iláhi Bakhsh Sáhib, of Máldah, rubbings of nine new inscriptions from Gaur, of which the most important are—(1) An inscription of 617 H. (A. D. 1219) of Jalál-uddín Mas'úd Jání, governor of Bengal. This is the oldest Muhammadan inscription hitherto discovered in Bengal. (2) An inscription of Yásuf Sháh, of 884 H. (A. D. 1479), ranking in beauty after the Adínah Mosque inscription. (3) A Mahmúd Sháhí inscription of 943 H. (A. D. 1530), from which we see that Mahmúd Sháh's nickname was *Badr-i-Sháhí*, which explains the occurrence of this name on Mahmúd Sháh's coinage.

Maulawí Sayyid Iláhi Bakhsh Sáhib has also written in Persian a historical work, entitled '*Khurshed-i-Jahán-numá*', containing a description of Gaur and Máldah, of which an English translation will be given.

The best thanks of the Society are due to the Maulawí Sáhib for his disinterestedness in placing his materials at the service of the Society.

(b.) *Coins.* Three new coins have been received for description from Mr. W. Campbell, Jalpaigori, viz., one struck by Fath Sháh in 887 H. (A. D. 1482), and the other two by Husain Sháh. Figures of the coins will be given. The latter coins have enabled me to solve the puzzling legend* on many of Husain Sháh's coins. The king describes himself on them as the conqueror of Kámrú, Kámtah, Jájagar, and Ásám, just as the Madrasah inscription of Gaur, discovered by Mr. Westmacott (Journal, As. Society, Bengal, Pt. I, for 1874, p. 303) describes Husain Sháh as the conqueror of Kámrú and Kámtah.

(c.) *Chronology.* The chronology of Bengal history, which may now be said to rest on a secure basis, is curiously verified in several points by Chinese historical works. M. Pauthier, in his "*Examen Methodique des faits qui concernent le Thian-tchu ou l'Inde*", published in 1839, mentions that A'ya-ssé-ting of Pang-ko-la, i. e., Ghiyás-uddín (A'zam Sháh) of Bengal, sent several embassies to China, which the Chinese returned. The last return embassy arrived in Bengal in the tenth year of the Chinese cycle called *young-lo*, and assisted at Ghiyás-uddín's funeral. According to Prinsep's tables, the tenth year of the cycle *young-lo*, would correspond to 1395 A. D., or 799 H., and this is the last year found by Mr. E. Thomas on A'zam Sháh's coinage. Another Chinese embassy arrived in Bengal in the 18th year of

* *Vide Journal, As. Socy. Bengal, 1873, Pt. I, p. 292, note.*

the same cycle, when *Saife-ting* is mentioned as the reigning monarch. This would be 1898 A. D., or 801.2 H., when, according to the testimony of a coin in the Society's cabinet, *Saif-uddin Hamzah Sháh*, was king of Bengal.

It is to be hoped that further researches in Chinese history will add to our knowledge of Bengal history.

Regarding *Rájá Káns Náráyan* of *Táhirpúr*, after whom the district of *Rájsháhi* is named, additional information has been obtained. Dr. *Rájendralála Mitra* succeeded in obtaining a copy of the genealogical tree of the *Rájás* of *Táhirpúr*, which shows that *Rájá Káns* was the grandson of *Rájá Bijaya Lashkar*. Just as some of the *Mahárájas* of *Jaipúr* received the title of 'Sawái', or one and one-fourth, to indicate that each was more than *one* man, so does the title of 'Lashkar' signify that the holder was considered in value equal to an army. It is also worth noticing that a large *parganah* in *Rájsháhi* has the name of *Lashkar*. *Rájá Káns's* grandfather, therefore, must have been a commander of distinction.

The above mentioned Chinese annals do not give *Rájá Káns's* name; the embassies were only renewed twenty-three years later, during the reign of *Muhammad Sháh*, *Rájá Káns's* son.

4. *On the Bharrs of Bundelkhand, with an account of an Inscription in Pálí characters.*—By VINCENT A. SMITH, B.A., C.S.

THE PRESIDENT said that as the evening was far advanced, he would not ask the Secretary to read the paper. The essay, with a few omissions, would be published in the *Journal* (No. III, for 1877). He would, however, exhibit the *Pálí* copper-plate, which accompanied the paper, and ask Dr. *Rájendralála Mitra* to offer some remarks on the plate, which was a clear forgery.

DR. MITRA observed that the inscription was remarkable in many respects. It was the only document in the ancient *Lát* character, which bore so recent a date as *Samvat 1404*. It was, likewise, the only record of a purely historical character which had been found engraved on a metal plate. It afforded, moreover, the only instance in which the *Lát* character had been used to record a document in the *Sanskrit* language. The purport of it was a long protracted war which had been carried on on the banks of the *Virabhadrá* river between the *Bharrs* and the *Lodhis*, the former headed by one *Kanja*, and the latter by *Sankara*. The war terminated in the overthrow of the *Bharrs*, when the images of the *Bharrs* were carved in stone, and those of the *Lodhis* made in alto-relievo, and left on the battle field. The document was inscribed, says the writer, on a bell-metal plate in *Pálí* character by the priest of the *Bharrs* in compliance with the order of the *Lodhi* king. Now, the facts which make the record most important are just such as are calculated to excite doubts about its authenticity. Both the *Bharrs*

and the Lodhis were perfectly unlettered, very primitive people, and it is difficult to conceive that they should have retained a thorough knowledge of the Lát character when every body else in all India had for centuries entirely forgotten it. That a conqueror should wish to perpetuate the memory of a successful war was but natural; but one would suppose that in such a case he would employ a person of his own side to write it down, and not employ the priest of his enemies. Nor is there any evidence to show that such a record was ever ordered by any mediæval Hindú or aboriginal king to be inscribed on a small metal plate. Such a plate could be seen by nobody, and would be lost in no time. A large stone, or the scarp of a rock, would be the proper receptacle for it; but it was not thought of. The character, too, in such a case would be that which was best known, and not what was quite unintelligible to the people of the country. How the writer came to know that Pálí was the name of the character, it is also difficult to conceive. Prinsep, when he first discovered the key to the alphabet called it Lát, because it occurred in its fullest extent on the Lát inscriptions of Aśoka. Subsequently, when it was found that the language of the records bore a strong resemblance to the Pálí of Ceylon some people called it Pálí; but the true Pálí character as still extant in Ceylon and Burmah is quite different, and the name is a misleading and incorrect one. How did the Lodhis commit the mistake? The word Pálí in their day would have applied to the Sinhalese Pálí; and not to the character of the Lát. Supposing that the Lát character was called Pálí in their time, why in selecting it the Pálí language was not also selected? Again, had the so-called Pálí, i. e., the Lát character, been then well known, why were not the Pálí numerals also used? The writer evidently knew them not, and therefore employed the modern Sanskrit figures slightly mystified by putting an extra scroll or two here and there? Further, the material of the record is called Kánsa or "bell-metal," and that metal is held by the Hindus to be impure, and never used for ceremonial purposes. In the Sástras copper is the metal commended for *sásanas*; brass is occasionally used, but never the kánsa. The speaker could not make out whether the plate was of bell-metal or brass; but he thought it looked very like the latter. It was besides a rolled plate, not a hammered or cast one, and bell-metal, being brittle, can neither be hammered nor rolled into plates. Taking it to be brass, it should be remembered that laminating rollers were perfectly unknown in India four hundred years ago, and even now are known only by name from the circumstances of rolled plates being brought out from England for sale in this country, and from some rollers being used in the Government mints. No one in India uses rollers for laminating brass. And this fact was alone sufficient to show that the plate was a forgery. A piece of rolled brass of the size of the plate was not worth more than four annas, and punching the letters on it would not cost much

more, and such a record could be easily prepared. Dr. Mitra was of opinion that some one who had got hold of a copy of Prinsep's plate of the Lāt alphabet, had got up the record to impose upon Mr. Smith. In Prinsep's time the Pāli numerals had not been discovered. It was only the other day that General Cunningham discovered only a few, and as this was not known to the forger, he was driven to the necessity of using the Sanskrit figures slightly altered. It seemed, too, that the man knew nothing of the Bhatta until he saw the name in English letters. In Sanskrit and Hindi the word is, and should be, written with the ॐ with a dot under it, to mark its peculiar sound. In English this cannot be reproduced, and the usual practice is, to write the word with two *rs* at the end. In Sanskrit this double *r* is never permitted; but, having seen it in English with a double *r*, the writer at once copied it in the Pāli character, and in a Sanskrit document. He had to prove his statement before an Englishman, and, apprehending that the use of the dotted ॐ should lead to doubts, he sacrificed Sanskrit grammar, and the usage of the country. It might be asked what would be the object of such a piece of imposition? But from the days of Wilford there have been so many attempts of the kind made by Pundits, that it is scarcely necessary to dwell upon it at length. The smile of a Sahib of high rank and the rewards expected are quite sufficient to account for such wicked acts.

The President said after the very clear statement made by Dr. Rajendra Lal, for which the Society was much indebted to him, there could be no doubt that the bronze plate in question was an impudent forgery. It was almost superfluous to multiply proofs in addition to those brought forward, but at least it was fair to ask why, if the ancient character was preserved the ancient numerals were not preserved also, and why with the characters of 250 B. C. were associated not the numerals of that date but the numerals of to-day?

Again the transliteration gave, not perhaps good Sanskrit, but at least intelligible sense, certain errors being overlooked. Still it seemed to the President very difficult to get the transliteration somewhat differently from the text of the plate; the very first letter of the first line might possibly be read as "go", but it was more like "ta." Moreover, unless the writer was very unversed in the character he used, the "dhavya" in the third line would surely have the vowel mark attached to the "y" rather than to the first letter of the compound, and the President thought that a scribe of Asoka's date would have written the "mahavirrya" of the transliteration.

Without going further, it seemed only too probable that the plate was produced from the transliteration, and not the transliteration from the plate, and that Mr Vincent Smith had unfortunately stumbled upon a Hindu "Simonides."

The reading of the following paper was postponed—

Pali Studies. No. 2. Vuttodaya. By Major G. E. FRYER, Deputy Commissioner, British Burma.

LIBRARY.

The following additions have been made to the Library since the Meeting held in November last.

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,
presented by the respective Societies or Editors.

Berlin. Die Königl. Preussische Akademie der Wissenschaften,—Monatsbericht, Juni, Juli, 1877.

Juni. *Siemens*.—Über die Abhängigkeit der elektrischen Leitungsfähigkeit des Selen von Wärme und Licht. *Peters*.—Ureptologische Notizen.

Bombay. The Indian Antiquary,—Vol. 6, No. 73.

Dr. Muir.—On the question whether Polyandry ever existed in Northern Hindustan.

Calcutta. The Geological Survey of India,—Records, Vol. X, Pt. 3, 1877.

Dr. Freismantel.—Notes on Fossil Floras in India. *W. Theobald*.—On the occurrence of Erratics in the Potwar, and the deductions that may be drawn therefrom. *F. B. Mallot*.—Limestones in the neighbourhood of Barakar.

———. The Mahabharat,—Vol. 3, No. 15.

———. The Rig Veda Samhita,—Vol. 1, No. 3.

Cambridge, U. S. The Museum of Comparative Zoology at Harvard College,—Bulletin, Vol. 3, Nos. 11—16.

———. Memoirs,—Vol. 2, Nos. 9, 10.

London. The Athenæum,—Nos. 2607—2611, 1877.

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[APPENDIX.]

LIST OF MEMBERS
OF THE
ASIATIC SOCIETY OF BENGAL.
ON THE 31ST DECEMBER, 1876.

LIST OF ORDINARY MEMBERS.

The * distinguishes Non-Subscribing, the † Non-Resident Members, and the ‡ Life-Members.

N. B.—Gentlemen who may have changed their residence, since this list was drawn up, are requested to give intimation of such a change to the *Secretaries*, in order that the necessary alterations may be made in the subsequent edition. Errors or omissions in the following list should also be communicated to the *Secretaries*.

Gentlemen who are proceeding to Europe, with the intention of not returning to India are particularly requested to notify to the *Secretaries*, whether it be their desire to continue as members of the Society, otherwise, in accordance with Rule 40 of the Bye-laws, their names will be removed from the list at the expiration of three years from the time of their leaving India.

Date of Election.			
1860 Dec.	5.	Abdul-Latif Khán Bahádúr, Maulawí.	Calcutta
1868 Sept.	2.	†Adam, R. M., Esq.	Agra
1860 July	4.	†Ahmad Khán Bahádúr, Sayyid, c. s. i.	Benares
1872 April	8.	†Ahsan-ullah, Nawáb.	Dacca
1860 April	4.	†Aitchison, J. E. T., Esq., M. D.	Jullundur
1868 Jan.	17.	*Allan, Lieut.-Col. A. S.	Europe
1871 June	7.	†Alexander, J. W., Esq.	Darbhanga
1860 Oct.	8.	Amír Ali Khán Bahádúr, Nawáb.	Calcutta
1874 June	8.	Amír Ali, Sayyid, Esq.	Calcutta
1865 Jan.	11.	Anderson, Dr. J., F. L. S.	Calcutta
1872 June	5.	†Anderson, A. Esq.	Fatehgarh
1875 June	2.	Apcar, J. G., Esq.	Calcutta
1875 Feb.	8.	Armstrong, J., Surg. B. Army.	Calcutta
1871 Sept.	6.	*Atkinson, E. T., Esq., c. s.	Europe [ana.
1869 Feb.	8.	†Attar Singh Bahádúr, Sirdár.	Bhadour, Ludi-
1870 Feb.	2.	†Baden-Powell, B. H., Esq., c. s.	Lahore
1878 Aug.	6.	†Badgley, Capt. W. F.	Shillong
1859 Aug.	8.	Balaichánd Sinha, Bábu.	Calcutta
1865 Nov.	7.	†Ball, V. Esq., M. A., Geol. Survey.	Geol. S. Office
1860 Nov.	1.	Banerjea, Rev. K. M., LL. D.	Calcutta
1878 June	7.	Baness, J. F., Esq.	Calcutta
1869 Dec.	1.	*Barker, B. A., Esq., M. A.	Europe
1878 March	5.	*Barclay, G. W. W., Esq., M. A.	Europe
1860 July	4.	Batten, G. H. M., Esq., c. s.	Calcutta
1859 May	4.	Bayley, E. C., The Hon. Sir, B. C. S., K. C. S. I.	Calcutta
1878 Feb.	5.	Bayne, R. R., Esq., B. A.	Calcutta
1864 Sept.	7.	†Beames, J., Esq., B. C. S.	Cuttak
1841 April	7.	*Beaufort, F. L., Esq., B. C. S.	Europe

Date of Election.			
1876 June 7.	†Behrendt, J., Esq.		Patna
1867 July 8.	Belletty, N. A., Esq.		Calcutta [ces
1862 Oct. 8.	*Bernard, C. E., Esq., c. s.		Central Provin.
1872 Aug. 7.	Deverley, H., Esq., c. s.		Calcutta
1876 Nov. 15.	†Beveridge, H., Esq., c. s.		Rangpur
1864 Nov. 2.	Bhudeva Mukerjee, Bábu.		Chinsurah
1874 Nov. 4.	Bhagabati Charn Mallik, Bábu.		Calcutta
1875 July 7.	†Black, F. C., Esq.		Hamirpur
1878 Dec. 8.	Blackburn, J., Esq.		Calcutta
1857 Mar. 4.	Blanford, H. F., Esq., A. B. S. M., F. G. S.		Calcutta
1859 Aug. 8.	†Blanford, W. T., A. B. S. M., F. B. S., F. G. S.		Geol. S. Office
1878 Aug. 6.	†Bligh, W. G., Esq.		Mathurá
1878 April 2.	†Blissott, T., Esq.		Dacca
1864 April 6.	Blochmann, H., Esq., M. A.		Calcutta
1878 Nov. 15.	†Bowie, Major, M. M.		Sambhalpur
1868 Jan. 15.	†Boxwell, J., Esq., c. s.		Dumka
1876 May 4.	†Bradshaw, A., Surgeon Major.		Simla
1860 March 7.	†Brandis, Dr. D.		Simla
1872 June 5.	*Brooks, W. E., Esq., c. E.		Europe
1871 Jan. 4.	Brough, R. S., Esq.		Calcutta
1866 Nov. 7.	†Browne, Col. Horace A.		Rangoon
1874 April 1.	Bruce, W. D., Esq., c. E.		Calcutta
1871 Sept. 6.	†Buckle, H., Esq.		N. Arracan
1869 Jan. 20.	†Cadell, A., Esq., B. A., c. s.		Banda
1863 June 8.	*Campbell, Sir G., K. C. S. I.		Europe
1878 Mar. 5.	†Cappel, A., Esq.		Simla
1876 Aug. 2.	†Carnegy, T. F., Esq.		Assam
1860 Jan. 8.	†Carnac, J. H. Rivett, Esq., B. C. S.		Ghazipur
1876 Nov. 15.	Cayley, H. Dr.		Calcutta
1875 April 4.	Chambers, Dr. E. W.		Calcutta
1868 Aug. 5.	†Chandramohan Goswámi, Pandit.		Gaubhatti
1872 Dec. 4.	†Chard, Rev. C. H.		Thayetmyo
1874 Aug. 5.	†Chennell, A. W., Esq., Topl. Survey.		Shillong
1875 June 2.	†Chennell, T., Esq.		Dibrúghar
1871 Sept. 6.	†Chisholm, R. F., Esq.		Bombay
1868 Feb. 5.	†Clark, Lieut.-Col. E. G., Bengal Staff Corps.		Kheri, Oudh
1872 Aug. 7.	*Clutterbuck, Capt. F. St. Quintin.		Europe
1874 Nov. 4.	†Constable, A., Esq.		Luoknow
1876 Mar. 1.	Crawfurd, J., Esq., c. s.		Calcutta
1868 Dec. 2.	†Cooke, J. E., Esq.		Madras
1876 April 5.	†Coxhead, T. E., Esq.		Tiperah
1874 March 4.	†Crombie, A., Esq., M. D.		Rangoon
1878 Aug. 6.	Cunningham, D. D., Esq., M. B.		Calcutta
1874 July 1.	†Cowan, Capt. S. H., B. S. C.		Arrah
1847 June 2.	*Dalton, Col. E. T., c. s. I., Staff Corps.		Europe
1870 May 4.	†Damant, G. H., Esq., c. s.		Cachar

Date of Election.			
1878 Dec.	8.	†Dames, M. L., Esq., C. S.	DeraGhaziKhan
1871 Jan.	4.	Daukes, F. C., Esq., C. S.	Calcutta
1861 Nov.	6.	†Davies, The Hon'ble R. H., C. S. I., B. C. S.	Lahore
1869 April	7.	*Day, Dr. F., F. L. S., F. Z. S.	Europe
1856 June	4.	†DeBourbel, Major R., Royal Engrs.	Lucknow
1874 July	1.	Deane, Capt. T.	Calcutta
1870 Feb.	2.	†DeFabock, F. W. A., Esq., I. M. Service.	Deoli
1872 Aug.	7.	Dejoux, P., Esq.	Calcutta
1869 Oct.	6.	†Delmerick, J. G., Esq.	Delhi
1878 Jan.	8.	†Dennys, H. L., Esq.	Sambalpur
1864 July	6.	Devendra Mallik, Bábu.	Calcutta
1862 May	7.	†Dhanapati Singh Dughar, Rái Bahádur.	Azimganj
1858 Sept.	7.	Dickens, Col. C. H., R. A., C. S. I.	Calcutta
1870 May	4.	†Dobson, G. E., Esq., B. A., M. B., F. L. S.	Europe
1875 March	8.	Dodgson, Walter, Esq.	Calcutta
1859 Sept.	7.	†Douglas, Col. C., R. A.	Lucknow
1875 March	8.	Douglas, J., Esq., Govt. Telg. Dept.	Calcutta
1874 July	1.	Drummond, Col. H., R. E.	Calcutta
1867 June	6.	†Duthoit, W., Esq., C. S.	Mirzapur
1871 March	1.	Dvijendranath Thakur, Bábu.	Calcutta
1870 March	8.	†Edinburgh, H. R. H. The Duke of.	Europe
1868 May	6.	†Edgar, J. W., Esq., C. S. I., B. C. S.	Darjiling
1874 Dec.	2.	†Egerton, The Hon. R. E., C. S., C. S. I.	Lahore
1871 Dec.	2.	Elliot, J., Esq., M. A.	Calcutta
1846 Jan.	7.	*Elliot, Sir Walter, late M. C. S.	Europe
1859 Nov.	2.	*Elliot, C. A., Esq., B. C. S.	Europe
1871 Oct.	4.	†Evezard, Col. G. E.	Púna
1868 Oct.	7.	*Ewart, J., Esq., M. D.	Europe
1859 Dec.	7.	Fath Ali, Maulawí,	Calcutta
1851 May	7.	*Fayrer, Sir J., K. C. S. I.	Europe
1868 Jan.	15.	†Fedden, Francis, Esq., Geol. Survey.	Karáchi
1876 Jan.	5.	Feistmantel, O., Esq., M. D., Geol. Survey.	Calcutta
1876 July	5.	†Foulkes, The Rev. Thos.	Bangalore
1868 May	6.	†Field, C. D., Esq., M. A., C. S.	Burdwan
1869 Sept.	1.	†Fisher, J. H., Esq., C. S.	Ohindwara
1872 Dec.	4.	*Forbes, Major J. G., R. E.	Arrah
1875 Jan.	6.	†Forbes, Capt. C. J. F. S., Depy. Comr.	Shwegyeen, B.
1861 Feb.	6.	†Forest, R., Esq., C. E.	Dehra [Burmah
1869 Oct.	12.	*Forlong, Lieut.-Col. J. G. R., M. S. C.	Europe
1868 June	8.	*Forsyth, Sir T. D., K. C. S. I., C. B.	Europe
1871 Nov.	1.	†Foster, J. M., Esq., M. B. C. P.	Nasira, Assam
1879 July	2.	†Fraser, Capt. E.	Bushire
1869 Sept.	1.	*Fryer, Major G. E.	Europe
1867 Sept.	4.	Fyfe, The Rev. W. C.	Calcutta
1878 Dec.	8.	†Gamble, J. S., Esq.	Pankabari, Dar- jiling

Date of Election.			
1871 Aug.	2.	†Gangaprasad, Munshi.	Moradabad
1874 July	1.	†Gardner, D. M., Esq.	Azamgarh
1859 Aug.	3.	†Gastrell, Col. J. E.	Europe
1862 Feb.	5.	†Gaurdās Baisāk, Bābu.	Birbhum
1867 Sept.	4.	†Gauvain, Capt. V.	
1867 Dec.	4.	*Gay, E. Esq., M. A.	Europe
1859 Sept.	7.	*Geoghegan, J. Esq., B. C. S.	Europe
1875 July	7.	†Girdlestone, C. E. R., Esq., C. S.	Nepal
1869 Feb.	3.	†Giriprasād Singh, Thākur.	Allighar
1861 Feb.	6.	Godwin-Austen, Major H. H., F. Z. S., F. R. G. S., Topographical Survey.	Calcutta
1872 Nov.	6.	Gordon, C. B. P., Esq.	Calcutta
1862 July	2.	†Gordon, Robert, Esq., C. E.	Henzada
1869 July	7.	†Gordon, J. D., Esq., C. S. I., C. S.	Bangalore
1875 July	7.	†Gouldsbury, J. R. E., Esq.	Montgomery
1863 Nov.	4.	†Gowan, Lieut.-Col. J. Y.	Europe
1866 June	6.	Gribble, T. W., Esq., B. C. S.	Calcutta
1876 Nov.	15.	Grierson, G. A., Esq., C. S.	Rangpur [jab
1861 Sept.	4.	†Griffin, L. H., Esq., B. C. S.	Kapūrthala, Pan-
1873 Aug.	6.	Girischandra Sinha, Rajah.	Calcutta
1861 Feb.	6.	†Growse, F. S., Esq., M. A., B. C. S.	Mathurā
1871 Jan.	4.	Gunendranath Thākur, Bābu.	Calcutta
Jan.	6.	*Gunn, J. S., Esq., M. B., Surg., Bengal Army.	Europe
1864 Dec.	5.	†Gurucharan Dās, Bābu.	Krishnagar
1871 June	7.	Habiburrahmán, Maulavi.	Calcutta
1867 July	3.	†Hacket, C. A., Esq., Geol. Survey.	Geol. S. Office
1869 April	3.	*Hæberlin, The Rev. C.	Europe [singh
1861 March	1.	†Harachandra Chaudhuri, Bābu.	Sherpur, Maiman-
1861 Feb.	2.	†Harrison, A. S., Esq., B. A.	Allahabad
1859 Oct.	6.	*Haughton, Col. J. C., C. S. I.	Europe
1874 Jan.	7.	Heintze, C., Esq.	Calcutta [ná
1875 March	3.	†Hendley, Dr. T. H.	Jaipur, Rájputā-
1875 Aug.	4.	†Hewitt, J. F. H., Esq., C. S.	Motihari
1868 Aug.	5.	†Hobart, B. T., Esq., C. S.	Allahabad
1872 Dec.	4.	*Hoernle, Rev. A. F., F. H. D.	Europe
1868 Nov.	4.	†Holroyd, Major W. R. M.	Lahore
1873 Jan.	8.	†Houstoun, G. L., Esq., F. G. S.	Europe
1863 Jan.	15.	†Howell, M. S., Esq., C. S.	Bulandshahr
1866 Feb.	7.	Hoyle, G. W., Esq.	Calcutta
1867 Aug.	7.	†Hughes, T. H., Esq., A. B. S. M., F. G. S.	Geol. S. Office
1873 March	5.	†Hughes, A. J., Esq., C. E.	Barrackpur
1866 Jan.	17.	†Hughes, Captain W. G., M. S. C.	Arracan
1870 Jan.	5.	†Hume, Allan O., Esq., C. B., C. S.	Rajputana
1870 June	1.	*Hunter, W. W., Esq., LL. D., C. S.	Europe
1868 April	1.	*Hyde, Col. H., B. E.	Europe
1872 Dec.	4.	†Ibbetson, D. C. J., Esq., C. S.	Karnál, Panjáb

Date of Election.		
1866 March 7.	†Irvine, W., Esq., C. S.	Fatehgarh.
1871 March 8.	Isaac, T. S., Esq., C. E.	Calcutta
1858 Dec. 7.	†Isvariprasád Singh Bahádúr, Raja.	Benares
1874 Feb. 4.	†Jackson, Dr. C. J.	Muzaffarpur
1876 July 5.	Jarrad, Lieut. F. W., R. N.	Calcutta
1865 June 7.	†Jaykissen Dás Bahádúr, Rájá, C. S. I.	Cawnpore
1878 Aug. 6.	Jogeshachandra Datta, Bábu.	Calcutta
1866 Feb. 7.	†Johnson, W. H., Esq.	Patna
1862 March 5.	*Johnstone, Major J. W. H.	Europe
1867 Dec. 4.	*Johnstone, Lt. Col. J.	Almora
1878 Dec. 8.	†Johore, H. H., Maharaja of, K. C. S. R.,	New Johore,
		Singapore
1878 April 2.	*Jones, F., Esq., C. S.	Europe
1875 Nov. 8.	†Jones, S. S., Esq., B. A., C. S.	Sasseram
1869 April 7.	Kabíruddín Ahmad, Maulawí.	Calcutta
1871 May 8.	Káliprasanna Ghosh, Bábu.	Calcutta
1861 Dec. 4.	†Kempson, M., Esq., M. A.	Allahabad
1875 April 7.	†Kerr, Ralph, Major, Lord.	Mathura
1874 Dec. 2.	†Khudábakhsh Khán, Maulawí.	Patna
1867 Dec. 4.	King, G., Esq., M. B.	Calcutta
1867 March 6.	†King, Capt. H. W.	P.&O Co.'s Office
1862 Jan. 15.	King, W., Jr., Esq., Geol. Survey of India.	Geol. Surv. Office
1875 Dec. 1.	Knight, J. B., Esq.	Calcutta
1876 April 5.	Kantichandra Sing, Kumara.	Calcutta
1860 May 5.	Kurz, S., Esq.	Calcutta
1859 Dec. 7.	*Leonard, H., Esq., M. A., C. E.	Europe
1870 July 6.	†Lethbridge, E., Esq., M. A.	Krishnagar
1869 June 2.	*Leupolt, J. C., Esq., C. S.	Europe
1878 Feb. 5.	Lewis, T. R., Esq., M. B.	Calcutta
1864 Nov. 2.	Locke, H. H., Esq.	Calcutta
1866 Jan. 17.	†Low, J., Esq., G. S. Survey.	B. Burmah
1869 July 7.	Lyll, C. J., Esq., B. A., C. S.	Calcutta
1876 May 4.	Lyll, John M., Esq.	Calcutta
1875 Jan. 6.	Lydekker, R., Esq., Geol. Survey of India.	Calcutta
1870 April 6.	†Lyman, B. Smith, Esq.	Japan
1866 June 6.	Macdonald, Lieut.-Col. J., B. S. C.	Calcutta
1876 Dec. 6.	†Macdonald, J. C., Esq.	N. W. P. Terai
1873 May 7.	*Mackay, W., Esq., C. E.	Europe
1878 Dec. 8.	McLeod, K., Esq., M. D.	Europe
1848 April 5.	†MacLagan, Major-General R., R. E., F. R. S. E., F. R. S. G. S.	Lahore
1867 July 8.	*Maenamara, Dr. C.	Europe
1868 Dec. 2.	†Macauliffe, M., Esq., C. S.	Jhelum
1874 Jan. 7.	†Magrath, C. F., Esq., C. S.	Bogra

Date of Election.			
1867 April	3.	Mahendralál Sirkár, Dr.	Calcutta
1867 April	3.	Mainwaring, Lieut.-Col. G. B.	Calcutta
1876 Dec.	6.	Malleson, Col. G. B., C. S. I.	Calcutta
1862 Nov.	8.	Manickjee Rustamjee, Esq.	Calcutta
1872 Nov.	6.	†Man, E. H., Esq.	Port Blair
1869 July	7.	†Markham, A. M., Esq., C. S.	Allahabad
1874 Aug.	5.	*Marsh, Capt. H. C.	Europe
1873 July	2.	†Marshall, C. W., Esq.	Berhampur
1873 Aug.	6.	†Marshall, Lieut.-Col. W. E.	Simla
1875 April	4.	McConnell, Dr. J. F. P., Prof. Med. Coll.	Calcutta
1876 Jan.	5.	†McGregor, W., Esq., Supt. I. Telegraph.	Akyab
1860 March	7.	†Medlicott, H. B., Esq., M. A., F. G. S. Supt. Geol. Survey.	Calcutta
1871 Sept.	6.	†Miles, Major S. B.	Muskat
1870 July	6.	*Miller, A. B., Esq.	Europe
1874 May	6.	†Minchin, F. J. V., Esq.	Aska, Ganjam
1875 Aug.	4.	†Minchin, Lieut.-Col. C. C.	Bahawalpur
1876 Dec.	6.	†Mockler, Capt. E., Pol. Agent.	Gwadur
1874 July	1.	†Molesworth, W. G., Esq., C. E.	Simla
1867 March	6.	*Montgomerie, Major T. G., R. E.	Europe
1854 Dec.	6.	Morris, The Hon'ble G. G., B. C. S.	Calcutta
1854 Oct.	11.	*Muir, Sir W., K. C. S. I., B. C. S.	Europe
1862 July	2.	*Napier of Magdala, Baron, General, G. C. S. I., G. C. B.	Europe
1876 May	4.	Nash, A. M., Esq.	Calcutta
1865 Feb.	1.	Nevill, G., Esq., C. M. Z. S.	Calcutta
1871 Jan.	4.	*Newton, Isaac, Esq.	Europe
1872 May	1.	†Niranjan Mukerji, Bábu.	Bonaras
1869 July	7.	†Nursing Rao, A. V., Esq.	Vizagapatam
1871 July	5.	†Oates, E. W., Esq., C. E.	Pegu
1874 Oct.	4.	O'Kinealy, J., Esq., C. S.	Calcutta
1851 June	4.	*Oldham, T., Esq., LL.D., F. R. S.	Europe
1873 Aug.	6.	Olpherts, W. J., Esq.	Calcutta
1864 March	2.	Palmer, Dr. W. J.	Calcutta
1873 Aug.	6.	Parker, J. C., Esq.	Calcutta
1876 June	7.	Parry, R., Esq.	Calcutta
1862 May	7.	†Partridge, S. B., Esq., M. D.	Europe
1871 Dec.	8.	†Peal, S. E., Esq.	Sibsagar, Assam
1867 March	6.	†Pearimohan Mukerji, Bábu, M. A.	Uttarpara
1860 Feb.	1.	*Pearse, Lieut.-Col. G. G.	Europe
1868 Nov.	4.	†Pearson, C. E., Esq., M. A.	Rawul Pindee
1873 Aug.	6.	Pedler, A., Esq.	Calcutta
1869 July	7.	Pell, S., Esq.	Calcutta
1864 March	2.	†Pellew, F. H., Esq., C. S.	Hooghly
1865 Sept.	3.	†Peppé, T. E., Esq.	Ranchi

Date of Election.			
1868 May	6.	Peterson, F. W., Esq.	Calcutta
1885 July	1.	†Phayre, Major-G., Sir A. P., K. C. S. I., C. B.	Mauritius
1864 Nov.	2.	*Phear, The Hon'ble J. B.	Europe
1869 Feb.	3.	†Pickford, J., Esq., M. A.	Madras
1875 Feb.	3.	†Porter, W. J., Esq.	Shwegyeen, B. Burmah
1868 April	1.	†Pramathanáth Ráy, Raja.	Digapati
1872 Dec.	4.	Prannáth Sarasvatí Pandit, M. A., B. L.	Bhawaniipur
1869 Feb.	3.	Pratápachandra Ghosha, Bábu, B. A.	Calcutta
1874 Dec.	2.	†Protheroe, Capt. M.	Port Blair
1866 Mar.	5.	Rájendralála Mitra, Bábu, Raí Bahádúr LL.D.	Calcutta
1871 June	7.	Rámakrishna Dás, Bábu.	Calcutta
1887 Feb.	1.	Rámanáth Tagor, The Hon. Mahárájá, C. S. I.	Calcutta
1874 Dec.	2.	†Rám Dás Sen, Bábu.	Berhampur
1876 July	5.	Raye, D. O'Connell, Esq., M. D.	Calcutta
1880 Mar.	7.	†Reid, H. S., Esq., C. S.	Allahabad
1871 July	5.	†Reid, J. R., Esq., C. S.	Azimghar
1872 April	3.	†Richards, Dr. V.	Goalundo
1868 April	1.	Robb, G., Esq.	Calcutta
1868 April	1.	†Robertson, C., Esq., C. S.	Mirzapur
1874 May	6.	*Robinson, Col. D. G., B. E.	Europe
1865 Feb.	1.	Robinson, S. H., Esq.	Calcutta
1876 Dec.	6.	†Rodon, Lieut. G. S., Royal Scots.	Banikhet
1870 Jan.	5.	*Ross, Alexander G., Capt., Staff Corps.	Europe
1871 Dec.	6.	*Samuells, Capt. W. L., B. S. C.	Europe
1872 Feb.	7.	†Sashagiri Sastri, M., B. A.	Madras
1870 May	4.	Satyánand Ghoshál, Rájá.	Calcutta
1878 Jan.	8.	Schlegel, F., Esq.	Calcutta
1870 May	4.	†Schlich, Dr. W.	Darjiling
1869 Feb.	3.	*Schwendler, L., Esq.	Europe
1876 July	5.	†Scott, D., Esq., C. E.	Cuttak
1876 July	5.	†Scott, B., Esq., C. S.	Muzaffarnagar
1874 July	1.	†Scully, Dr. J.	Nepal
1876 Feb.	2.	†Shaw, R. B., Esq.	mir (Ladak) Kash-
1860 July	4.	†Shelverton, G., Esq.	Waltair, near Vizagapatam
1868 April	1.	†Showers, Lieut.-Col. C. L.	Amballa
1872 Aug.	7.	†Skrefarud, Rev. L. O.	Santhal Mission Rampur Haut
1864 Sept.	7.	†Sladen, Lieut.-Col. E. B.	Arracan
1875 Feb.	3.	*Smidt, J., Esq.	Europe
1865 July	5.	Smith, D. Boyes, Esq., M. D.	Calcutta
1874 June	3.	†Smith, V. A., Esq., C. S.	Hamirpur
1864 Mar.	2.	†Spearman, Capt. H. R.	Amherst

Date of Election.			
1872 July	3.	†Stephen, Carr, Esq.	Ludianah
1868 Sept.	2.	†Stewart, R. D., Esq.	Raniganj
1875 July	7.	*Stewart, M. G., Esq.	Europe
1876 Aug.	2.	†St. John, Major O. B., R. E.	Ajmir, Mayo College
1861 Sept.	4.	Stokes, Whitley, Esq., C. S. I.	Calcutta
1860 Feb.	8.	Strachey, The Hon'ble Sir J., K. C. S. I.	Calcutta
1859 Mar.	2.	Stubbs, Lieut.-Col. F. W., Royal Artillery.	Ishapur near Barrackpur
1858 July	7.	†Sutherland, H. C., Esq., U. C. S.	Backergunge
1864 Aug.	11.	Swinhoe, W., Esq.	Calcutta
1865 Sept.	6.	*Tawney, C. H., Esq., M. A.	Europe
1865 April	5.	Taylor, R., Esq., C. S.	Calcutta
1874 Mar.	4.	Taylor, Commander A. D., late Indian Navy.	Calcutta
1860 May	2.	†Temple, The Hon. Sir R., Bart., K. C. S. I., B. C. S.	Bombay
1876 Feb.	2.	Tonnant, Col. J. F., R. E., F. R. S.	Calcutta
1875 June	2.	†Thibaut, Dr. G.	Benares
1869 Oct.	6.	†Thomson, A., Esq.	Faizabad
1875 Nov.	3.	†Thomson, R. G., Esq., C. S.	Sirsa
1847 June	2.	Thuillier, Col. H. L., B. A., C. S. I., F. R. S.	Calcutta
1865 July	5.	*Tolbort, T. W. H., Esq., C. S.	Europe
1871 April	5.	*Treffitz, Oscar, Esq.	Europe
1861 June	5.	†Tremlett, J. D., Esq.; M. A., C. S.	Muzaffargarh
1872 July	8.	†Trevor, W. S., Lieut.-Col., R. E.	Indor
1873 April	2.	Turnbull, R., Esq.	Calcutta
1868 May	6.	†Tyler, J. W., Esq., M. D.	Agra
1869 June	2.	†Udaychand Dutt, Bábu.	Faridpur
1873 April	2.	Umesh Chunder Dutt, Bábu.	Calcutta
1860 May	2.	*Vanrenen, Lieut. Col. A. D., B. C. S.	Calcutta
1864 Feb.	3.	†Verchère, A. M., Esq., M. D.	Agra
1864 April	6.	†Vijayarāma Gujapati Raj Munniá Sultán Bahádur, Maharajah Mirza Vijayagram.	Benares
1870 June	1.	†Vrindávanachandra Mandala, Bábu.	Balisor
1871 Feb.	1.	*Waagen, Dr. W., Geological Survey.	Europe
1869 Aug.	4.	Wáhid Ali, Prince Jahan Qadr Muhammad Bahádur.	Garden Reach
1865 Nov.	1.	Waldie, D., Esq., F. G. S.	Calcutta
1861 May	1.	*Walker, Col. J. T., R. E., F. R. S.	Europe
1875 April	7.	Wall, Dr. A. J., B. Medical Service.	Calcutta
1863 Oct.	7.	Waller, W. K., Esq., M. B.	Calcutta
1865 May	3.	Waterhouse, Capt. J., B. S. C.	Calcutta

Date of Election.		
1874 July	1.	Watt, Dr. George.
1876 Dec.	6.	Webb, W. T., Esq., M. A.
1880 Sept.	1.	*Westland, J., Esq., C. S.
1887 Feb.	6.	†Westmacott, E. V., Esq., B. A., C. S.
1882 Oct.	8.	Wheeler, J. T., Esq.
1878 April	2.	†White, E., Esq., C. S.
1876 Feb.	8.	†Whiteway, R. S., Esq., C. S.
1867 Aug.	7.	†Wilcox, F., Esq.
1878 May	7.	†Williams, G. R. C., Esq., C. S.
1867 Jan.	16.	†Williamson, Capt. W. J.
1876 April	5.	Wilson, Alexander, Esq.
1870 Aug.	3.	Wilson, R. H., Esq., C. S.
1866 Mar.	7.	*Wise, Dr. J. F. N.
1867 July	8.	†Wood, Dr. J. J.
1874 Mar.	4.	Wood, C. H., Esq.
1870 Jan.	5.	Wood-Mason, J., Esq., Indian Museum.
1878 Aug.	6.	†Woodthorpe, Lieut. R. G., B. E.
1869 Sept.	1.	Yadulál Mallik, Bábu.
1868 June	8.	Yatindramohana Tagore, The Hon'ble Maharaja.
1867 Mar.	6.	†Yogendranáth Mallik, Bábu.
HONORARY MEMBERS.		
1825 Mar.	9.	M. Garcin de Tassy, Memb. de l'Institut.
1821 "	6.	Sir John Phillippart.
1826 July	1.	Count de Noe.
1835 May	6.	Professor Isaac Lea.
1847 Sept.	1.	Col. W. Munro.
1847 Nov.	8.	His Highness the Nawab Nazim of Bengal.
1848 Feb.	2.	Dr. J. D. Hooker.
1848 Mar.	8.	Professor Henry.
1858 April	6.	Major-Gen. Sir H. C. Rawlinson, K. C. B.
1858 July	6.	B. H. Hodgson.
1859 Mar.	2.	The Hon'ble Sir J. W. Colville, Kt.
1860 "	7.	Professor Max Müller.
1860 Nov.	7.	Monsieur Stanislas Julien.
1860 "	7.	Edward Thomas.
1860 "	7.	Dr. Aloys Sprenger.
1860 "	7.	Dr. Albrecht Weber.
1868 Feb.	5.	General A. Cunningham, C. S. I.
1868 "	5.	Professor Bápu Déva Sástri.
1868 "	5.	Dr. T. Thomson.
1868 "	2.	A. Grote.
1871 "	7.	Charles Darwin.
		Hughli
		Calcutta
		Europe
		Dinajpur
		Calcutta
		Bijnour
		Muttra
		Purulia
		Banda
		Garo Hills
		Calcutta
		Calcutta
		Europe
		Ránci
		Calcutta
		Calcutta
		Nága Hills
		Calcutta
		Calcutta
		Andul
		Paris
		London
		Paris
		Philadelphia
		London
		Murshidabad
		Kew
		Princeton, U. S.
		London
		Europe
		Europe
		Oxford
		Paris
		London
		Bern
		Berlin
		India
		Benares
		London
		London
		London

Date of Election.			
1872 Feb.	1.	Sir G. B. Airy.	London
1872 June	5.	Professor T. H. Huxley.	London
1875 Nov.	8.	Dr. O. Bohtlingk.	Jena
1875 "	8.	Professor J. O. Westwood.	Oxford
1876 April	5.	Yule, Col. H., R. E., C. B.	London
1876 "	5.	Siemons, Dr. Werner.	Berlin

CORRESPONDING MEMBERS.

1844 Oct.	2.	Macgowan, Dr. J.	Europe
1856 June	4.	Krauer, Herr A. von.	Alexandria
1856 "	8.	Porter, Rev. J.	Damascus
1856 "	4.	Schlagintweit, Herr H. von.	Munich
1856 "	4.	Smith, Dr. E.	Beyrout
1859 "	4.	Tailor, J., Esq.	Bussorah
1857 Mar.		Nietner, J. Esq.	Ceylon
1858 "	8.	Schlagintweit, Herr R. von.	Giessen
1859 Nov.	2.	Frederick, Dr. H.	Batavia
1859 May	4.	Bloeker, Dr. H.	Europe
1860 Feb.	1.	Baker, Tho Rev. H.	E. Malabar
1860 "	1.	Swinhoe, R., Esq., H. M.'s Consul.	Amoy
1861 July	8.	Gösche, Dr. R.	
1862 Mar.	5.	Murray, A., Esq.	London
1863 July	4.	Barnes, R. H., Esq.	Ceylon
1866 May	7.	Schlagintweit, Prof. E. von.	Munich
1866 "	7.	Sherring, Rev. M. A.	Benares
1868 "	5.	Holmboe, Prof.	Christiania

ASSOCIATE MEMBERS.

1865 May	8.	Dall, Rev. C. H.	Calcutta
1874 Feb.	4.	Schaumburgh, J., Esq.	Calcutta
1874 April	1.	Lafont, Rev. F. E., s. J.	Calcutta
1875 Dec.	1.	Bate, Rev. J. D.	Allahabad
1875 "	1.	Maulawī Abdul Hai, Madrasah.	Calcutta

LIST OF MEMBERS WHO HAVE BEEN ABSENT FROM INDIA THREE YEARS AND UPWARDS.*

**Rule 40.*—After the lapse of 3 years from the date of a Member leaving India, if no intimation of his wishes, shall, in the interval have been received by the Society his name shall be removed from the list of Members.

The following Members will be removed from the Member List of the Society under the operation of the above Rule.

	Date of leaving India.
Clutterbuck, Capt. F. St. Quintin,.....	January 1873.
Gauvain, Capt. V.,	July 1873.
Haeberlin, the Rev. C.,	August 1873.
Pearson, C. E., Esq., M. A.,	January 1874.

LOSS OF MEMBERS DURING 1873.

BY RETIREMENT.

C. Macnaghten, Esq.	Rajkot College.
W. Bourne, Esq.	Calcutta.
G. E. Knox, Esq.	Banda.
Major H. H. Mallock.	Calcutta.
Lieut. H. B. Urmston.	Panjab.
W. Theobald, Esq.	Calcutta.
H. C. Williams, Esq.	Chanda.
A. Tween, Esq.	Calcutta.
R. Stewart, Esq.	Calcutta.
T. B. Mitchell, Esq.	Assam.
Raja Harendra Krishna Bahadur.	Calcutta.
J. Wilson, Esq.	Bankipur.
C. T. Buckland, Esq.	Calcutta.
Capt. E. N. D. La Touche.	Assam.
Capt. O. S. Pratt.	Europe.
J. Hector, Esq.	Calcutta.
R. A. Carrington, Esq.	Calcutta.

BY DEATH.

Ordinary Members.

Butler, Capt. J., B. S. C.	Samaguting.
Willson, W. G., Esq.	Calcutta.
Atkinson, W. S., Esq., M. A.	Europe.
Heeley, W. L., Esq., B. A., C. S.	Europe.
Brown, R., Esq., M. D.	Manipur.
Milman, R., D. D., the Right Rev., Lord Bishop of Calcutta.	Calcutta.

Honorary Members.

Prof. C. Lassen.	Bonn.
Prof. Jules Mohl.	Paris.
Dr. Robert Wight, (<i>died in 1878.</i>)	London.

Corresponding Members.

Hang, Dr. M.	Munich.
Foucaux, M. F. H.	Paris.

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[APPENDIX.]

ABSTRACT STATEMENT  
OF  
RECEIPTS AND DISBURSEMENTS  
OF THE  
ASIATIC SOCIETY OF BENGAL  
FOR  
THE YEAR 1876.

# STATEMENT, *Abstract of the Cash Account*

| RECEIPTS.                                                                                                                                             |               |              | 1876.      | 1875.      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|------------|------------|
| <b>BALANCE OF 1875.</b>                                                                                                                               |               |              |            |            |
| In the Bank of Bengal, <i>viz.</i>                                                                                                                    |               |              |            |            |
| Account of Stolickka Memorial Fund, ..                                                                                                                | Rs. 812 5 2   |              |            |            |
| Account of Asiatic Society of Bengal, ..                                                                                                              | .. 3,045 13 1 |              |            |            |
|                                                                                                                                                       |               | 3,858 2 3    |            |            |
| Cash in hand, ..                                                                                                                                      | ..            | 160 9 4      |            |            |
|                                                                                                                                                       |               |              | 4,018 11 7 |            |
| <b>ADMISSION FEES.</b>                                                                                                                                |               |              |            |            |
| Received from Members, ..                                                                                                                             | ..            | 800 0 0      |            |            |
|                                                                                                                                                       |               |              | 800 0 0    | 930 0 0    |
| <b>SUBSCRIPTIONS.</b>                                                                                                                                 |               |              |            |            |
| Received from Members, ..                                                                                                                             | ..            | 9,009 1 9    |            |            |
|                                                                                                                                                       |               |              | 9,009 1 9  | 9,760 15 0 |
| <b>PUBLICATIONS.</b>                                                                                                                                  |               |              |            |            |
| Sale proceeds of Journal and Proceedings, ..                                                                                                          | ..            | 409 0 0      |            |            |
| Subscription to ditto, ..                                                                                                                             | ..            | 1,056 0 0    |            |            |
| Refund of Postage Stamps, ..                                                                                                                          | ..            | 16 14 6      |            |            |
| Ditto of Printing charges, ..                                                                                                                         | ..            | 54 9 6       |            |            |
|                                                                                                                                                       |               |              | 1,535 8 0  | 1,729 10 0 |
| <b>LIBRARY.</b>                                                                                                                                       |               |              |            |            |
| Sale proceeds of Books, ..                                                                                                                            | ..            | 280 3 0      |            |            |
| Refund of Freight, ..                                                                                                                                 | ..            | 23 12 0      |            |            |
| Ditto of Postage ..                                                                                                                                   | ..            | 8 10 6       |            |            |
|                                                                                                                                                       |               |              | 312 9 6    | 411 14 0   |
| <b>SECRETARY'S OFFICE.</b>                                                                                                                            |               |              |            |            |
| Saving of Salary, ..                                                                                                                                  | ..            | 36 5 3       |            |            |
| Received fine, &c., ..                                                                                                                                | ..            | 2 8 3        |            |            |
| Ditto Commission on Purchase of Stamps, ..                                                                                                            | ..            | 6 9 9        |            |            |
| Sale proceeds of two Wooden Casks, ..                                                                                                                 | ..            | 1 11 0       |            |            |
| Refund of Cart and Cooly hire, ..                                                                                                                     | ..            | 13 6 0       |            |            |
|                                                                                                                                                       |               |              | 60 8 3     | 24 15 6    |
| <b>VESTED FUND.</b>                                                                                                                                   |               |              |            |            |
| Received from the Secretary of State for India on account of abandonment by the Society of all claims to accommodation in the New Museum building, .. | ..            | 1,50,000 0 0 |            |            |
| Interest on the Government Securities from the Bank of Bengal, ..                                                                                     | ..            | 8,573 0 0    |            |            |
| Sale proceeds of 5½ per cent. Government Securities Nos. 043894, 043518, 189, 60,                                                                     | ..            | 5,000 0 0    |            |            |
| Carried over Ra.                                                                                                                                      | 1,63,573 0 0  |              | 16,736 7 1 |            |

# No. 1.

## *of the Asiatic Society for 1876.*

| DISBURSEMENTS.                                                                                                                                |            | 1876.      | 1875.     |
|-----------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|-----------|
| PUBLICATIONS.                                                                                                                                 |            |            |           |
| Paid Freight for sending Journal and Proceedings, ..                                                                                          | 108 9 0    |            |           |
| Ditto Lithographing and Engraving charges, &c., ..                                                                                            | 1,605 11 0 |            |           |
| Ditto Printing charges, ..                                                                                                                    | 5,381 9 6  |            |           |
| Ditto Commission on Collecting Bills, ..                                                                                                      | 3 4 3      |            |           |
| Ditto Purchase of Postage Stamps, ..                                                                                                          | 281 0 0    |            |           |
| Ditto Packing charges, ..                                                                                                                     | 24 11 0    |            |           |
| Ditto Paper for Plates, ..                                                                                                                    | 153 6 0    |            |           |
| Ditto Journal Binding, ..                                                                                                                     | 6 0 0      |            |           |
| Ditto Printing charges for a Catalogue of Mammals and Birds of Burmah for Journal Part II, No. 1 of 1875 (£ 62-4-6 (or 1s. 9d. per rupee), .. | 711 2 3    |            |           |
| Ditto overland carriage on parcels of lithographed Plates, from England, ..                                                                   | 42 2 0     |            |           |
| Ditto Major H. H. Godwin-Austen for printing and coloring Plates of Naga Hill Views, Dafia Shells, &c., ..                                    | 499 9 0    |            |           |
| Ditto Petty charges, ..                                                                                                                       | 16 14 6    |            |           |
|                                                                                                                                               |            | 8,893 14 6 | 7,373 2 1 |
| LIBRARY.                                                                                                                                      |            |            |           |
| Paid Salary of Librarian, ..                                                                                                                  | 1,800 0 0  |            |           |
| Ditto Establishment, ..                                                                                                                       | 138 0 0    |            |           |
| Ditto Commission on Collecting Bills, ..                                                                                                      | 0 1 3      |            |           |
| Ditto Landing charges, ..                                                                                                                     | 10 3 3     |            |           |
| Ditto Book Binding, ..                                                                                                                        | 408 2 0    |            |           |
| Ditto Salary of Punkha Bearer, ..                                                                                                             | 38 5 3     |            |           |
| Ditto Subscription to the Calcutta Review, ..                                                                                                 | 10 0 0     |            |           |
| Ditto ditto to the Medical Gazette, ..                                                                                                        | 15 0 0     |            |           |
| Ditto ditto to Stray Fowthers, ..                                                                                                             | 11 0 0     |            |           |
| Ditto Purchase of Books through Messrs. Tribner & Co., ..                                                                                     | 177 9 6    |            |           |
| Ditto ditto of ditto through Messrs. Friedlander and Sohn, ..                                                                                 | 172 14 6   |            |           |
| Ditto ditto of ditto in Calcutta, ..                                                                                                          | 306 9 2    |            |           |
|                                                                                                                                               | 657 1 2    |            |           |
| Ditto repairing glass cases, ..                                                                                                               | 23 0 0     |            |           |
| Ditto Freight, ..                                                                                                                             | 5 1 5      |            |           |
| Ditto Insufficient and Bearing Postage, ..                                                                                                    | 3 1 0      |            |           |
| Ditto a Teakwood Double Ladder, ..                                                                                                            | 12 0 0     |            |           |
| Ditto Petty charges, ..                                                                                                                       | 26 8 3     |            |           |
|                                                                                                                                               |            | 3,161 7 7  | 4,475 6 6 |
| SECRETARY'S OFFICE.                                                                                                                           |            |            |           |
| Paid General Establishment, ..                                                                                                                | 397 8 0    |            |           |
| Ditto Secretary's Establishment, ..                                                                                                           | 1,658 0 0  |            |           |
| Ditto Purchase of Postage Stamps, ..                                                                                                          | 124 0 0    |            |           |
| Carried over, Rs.                                                                                                                             | 2,179 8 0  | 12,055 6 1 |           |

| RECEIPTS.                                                                                                                               |                 |  |  | 1876.         | 1875.        |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------|--|--|---------------|--------------|
| Brought over, Rs. 1,63,673 0 0                                                                                                          |                 |  |  | 15,786 7 1    |              |
| Interest on ditto from 30th November to 12th December, 1876, being 12 days @ $5\frac{1}{2}$ per cent., ..                               | 9 2 8           |  |  |               |              |
| Premium on ditto @ 1-14 per cent., ..                                                                                                   | 93 12 0         |  |  |               |              |
|                                                                                                                                         | <u>102 14 8</u> |  |  | 1,63,675 14 8 | 449 0 0      |
| <b>BUILDING.</b>                                                                                                                        |                 |  |  |               |              |
| Received from the Right Hon'ble the Secretary of State for India from 1st December, 1875 to 21st April, 1876, @ Rs. 400 per month, ..   |                 |  |  |               |              |
|                                                                                                                                         | 1,920 0 0       |  |  | 1,920 0 0     | 4,800 0 0    |
| <b>DR. STOLICER'S MEMORIAL FUND.</b>                                                                                                    |                 |  |  |               |              |
| Received Subscription to the Fund, ..                                                                                                   |                 |  |  |               |              |
|                                                                                                                                         | 181 0 0         |  |  | 181 0 0       | 1,350 0 0    |
| <b>PIDDINGTON FUND.</b>                                                                                                                 |                 |  |  |               |              |
| Refund by the Committee of the Chamber of Commerce of the moiety of Subscriptions to the Fund, from the Asiatic Society (Rs. 1,172), .. |                 |  |  |               |              |
|                                                                                                                                         | 586 4 0         |  |  | 586 4 0       |              |
| <b>PIDDINGTON PENSION FUND.</b>                                                                                                         |                 |  |  |               |              |
| Received by Transfer from the Piddington Fund, ..                                                                                       |                 |  |  |               |              |
|                                                                                                                                         | 586 4 0         |  |  |               |              |
| Deduct Refund to Capt. W. J. A. Wallace, of half his subscription, ..                                                                   |                 |  |  |               |              |
|                                                                                                                                         | 8 0 0           |  |  | 578 4 0       |              |
| Subscription Received from W. T. Blanford, Esq., to the Fund, ..                                                                        |                 |  |  |               |              |
|                                                                                                                                         | 25 0 0          |  |  |               |              |
| Ditto Interest on the Government Security of Rs. 500, ..                                                                                |                 |  |  |               |              |
|                                                                                                                                         | 27 8 0          |  |  | 630 12 0      |              |
| <b>DR. OLDEHAM MEMORIAL FUND.</b>                                                                                                       |                 |  |  |               |              |
| Received Subscription to the Fund, ..                                                                                                   |                 |  |  |               |              |
|                                                                                                                                         | 156 0 0         |  |  | 156 0 0       |              |
| <b>MISCELLANEOUS.</b>                                                                                                                   |                 |  |  |               |              |
| Fund Account, ..                                                                                                                        |                 |  |  |               |              |
|                                                                                                                                         | 1,040 7 6       |  |  |               |              |
| O. P. Fund, ..                                                                                                                          |                 |  |  |               |              |
|                                                                                                                                         | 1,086 5 9       |  |  |               |              |
| Conservation of Sanscrit MSS., ..                                                                                                       |                 |  |  |               |              |
|                                                                                                                                         | 1,000 0 0       |  |  |               |              |
| W. Irvine, Esq., ..                                                                                                                     |                 |  |  |               |              |
|                                                                                                                                         | 10 12 0         |  |  |               |              |
| M. S. Howell, Esq., ..                                                                                                                  |                 |  |  |               |              |
|                                                                                                                                         | 0 9 0           |  |  |               |              |
| Capt. W. L. Samuels, ..                                                                                                                 |                 |  |  |               |              |
|                                                                                                                                         | 5 13 0          |  |  |               |              |
| O. W. Marshall, Esq., ..                                                                                                                |                 |  |  |               |              |
|                                                                                                                                         | 3 7 0           |  |  |               |              |
| The Rev. O. H. Chard, ..                                                                                                                |                 |  |  |               |              |
|                                                                                                                                         | 0 6 0           |  |  |               |              |
| J. W. Edgar, Esq., ..                                                                                                                   |                 |  |  |               |              |
|                                                                                                                                         | 4 11 0          |  |  |               |              |
| Money Lal Bysack, ..                                                                                                                    |                 |  |  |               |              |
|                                                                                                                                         | 67 13 0         |  |  |               |              |
| Jadubindo Bysack, ..                                                                                                                    |                 |  |  |               |              |
|                                                                                                                                         | 498 10 6        |  |  |               |              |
| T. W. H. Tolbert, Esq., ..                                                                                                              |                 |  |  |               |              |
|                                                                                                                                         | 3 6 0           |  |  |               |              |
| Messrs. Trübner & Co., ..                                                                                                               |                 |  |  |               |              |
|                                                                                                                                         | 4 6 6           |  |  |               |              |
| Capt. C. J. F. Forbes, ..                                                                                                               |                 |  |  |               |              |
|                                                                                                                                         | 5 0 0           |  |  |               |              |
| W. W. Hunter, Esq., ..                                                                                                                  |                 |  |  |               |              |
|                                                                                                                                         | 1 8 0           |  |  |               |              |
| L. Schwendler, Esq., ..                                                                                                                 |                 |  |  |               |              |
|                                                                                                                                         | 9 7 0           |  |  |               |              |
| H. Blochmann, Esq., ..                                                                                                                  |                 |  |  |               |              |
|                                                                                                                                         | 9 0 0           |  |  |               |              |
| G. Nevill, Esq., ..                                                                                                                     |                 |  |  |               |              |
|                                                                                                                                         | 6 11 9          |  |  |               |              |
| Carried over, Rs.                                                                                                                       |                 |  |  | 3,753 6 0     | 1,82,886 5 9 |



|                                                  |                   | DISBURSEMENTS.. |    | 1876. | 1875.      |
|--------------------------------------------------|-------------------|-----------------|----|-------|------------|
|                                                  |                   |                 |    |       |            |
|                                                  | Brought over, Ra. | 2,179           | 8  | 0     | 12,055 6 1 |
| Paid Insufficient and Bearing Postage,           |                   | 4               | 14 | 0     |            |
| Ditto Meeting charges, ..                        |                   | 128             | 11 | 0     |            |
| Ditto Commission on Subscription collected,      |                   | 54              | 14 | 3     |            |
| Ditto Salary of Mali, ..                         |                   | 72              | 0  | 0     |            |
| Ditto Printing charges, ..                       |                   | 198             | 16 | 6     |            |
| Ditto Pension to Ialum Khan, ..                  |                   | 86              | 0  | 0     |            |
| Ditto Fee to the Bank of Bengal for              |                   |                 |    |       |            |
| Stamping cheques, ..                             |                   | 3               | 2  | 0     |            |
| Ditto Stationery, ..                             |                   | 58              | 1  | 0     |            |
| Ditto Binding Letter files, ..                   |                   | 6               | 13 | 0     |            |
| Ditto Advertising charges, ..                    |                   | 43              | 0  | 0     |            |
| Ditto Subscription to the Calcutta Di-           |                   |                 |    |       |            |
| rectory, ..                                      |                   | 14              | 0  | 0     |            |
| Ditto ditto to the Army List, ..                 |                   | 12              | 0  | 0     |            |
| Ditto Carpenter for open-                        |                   |                 |    |       |            |
| ing and fixing glass cases, 24                   | 14                | 0               |    |       |            |
| Ditto ditto for repairing                        |                   |                 |    |       |            |
| Book Shelves, Meeting                            |                   |                 |    |       |            |
| Table, &c., ..                                   | 28                | 2               | 0  |       |            |
|                                                  |                   | 53              | 0  | 0     |            |
| Ditto to the Collector of                        |                   |                 |    |       |            |
| Stamps Revenue of Cal-                           |                   |                 |    |       |            |
| cutta for Stamping the                           |                   |                 |    |       |            |
| Memorandum of Associa-                           |                   |                 |    |       |            |
| tion of the Asiatic Society, 16                  | 0                 | 0               |    |       |            |
| Ditto Registration fee for                       |                   |                 |    |       |            |
| ditto, ..                                        | 50                | 0               | 0  |       |            |
|                                                  |                   | 66              | 0  | 0     |            |
| Ditto a copy of Indian Postal Guide, ..          |                   | 1               | 0  | 0     |            |
| Ditto Petty charges, ..                          |                   | 65              | 8  | 3     |            |
| Ditto Ticca Cooley for removing Books            |                   |                 |    |       |            |
| and Shelves, &c., ..                             |                   | 78              | 6  | 0     |            |
|                                                  |                   | 3,075           | 8  | 0     | 3,769 9 9  |
| FURNITURE AND FITTINGS.                          |                   |                 |    |       |            |
| Paid a Teakwood Table for Duffery, ..            |                   | 14              | 0  | 0     |            |
| Ditto three Teakwood Backs, ..                   |                   | 183             | 0  | 0     |            |
| Ditto a Teakwood large Glass Case, ..            |                   | 253             | 0  | 0     |            |
| Ditto Repairing and fixing                       |                   |                 |    |       |            |
| Cane Matting in four                             |                   |                 |    |       |            |
| rooms, ..                                        | 298               | 0               | 0  |       |            |
| Ditto Supplying and fixing                       |                   |                 |    |       |            |
| New Cane Matting, ..                             | 1,146             | 10              | 0  |       |            |
|                                                  |                   | 1,444           | 10 | 0     |            |
| Ditto a dozen of Teakwood rattan-back            |                   |                 |    |       |            |
| Arm-chairs, ..                                   |                   | 67              | 4  | 0     |            |
| Ditto a pair six branches Gaselier, ..           |                   | 400             | 0  | 0     |            |
|                                                  |                   | 2,361           | 14 | 0     |            |
| VARNED FUND.                                     |                   |                 |    |       |            |
| Paid Purchase of $\frac{5}{4}$ per cent. Govern- |                   |                 |    |       |            |
| ment Security through Bank of Bengal, 1,44,800   | 0                 | 0               |    |       |            |
| Ditto Interest on ditto, ..                      | 2,716             | 10              | 7  |       |            |
| Ditto Premium on ditto, ..                       | 3,025             | 10              | 0  |       |            |
| Ditto Commission on ditto, ..                    | 376               | 5               | 6  |       |            |
| Ditto ditto on Collecting Interest               |                   |                 |    |       |            |
| on Government Securities, ..                     | 21                | 6               | 8  |       |            |
| Ditto ditto on Selling Govern-                   |                   |                 |    |       |            |
| ment Security of Rs. 5,000, ..                   | 12                | 12              | 1  |       |            |
|                                                  |                   | 17,492          | 12 | 1     |            |
| Carried over, Ra.                                | 1,50,952          | 12              | 10 |       |            |

| RECEIPTS.                                  |    |    |    | 1876. |    |   | 1875.    |   |   |
|--------------------------------------------|----|----|----|-------|----|---|----------|---|---|
| Brought over, Rs.                          |    |    |    | 3,753 | 0  | 0 | 1,82,886 | 5 | 9 |
| Dr. G. Thibaut,                            | .. | .. | .. | 27    | 0  | 0 |          |   |   |
| The Hon'ble C. R. Lindsay,                 | .. | .. | .. | 0     | 11 | 0 |          |   |   |
| H. W. Dashwood, Esq.,                      | .. | .. | .. | 0     | 12 | 0 |          |   |   |
| Babullah Duffery,                          | .. | .. | .. | 10    | 0  | 0 |          |   |   |
| Dr. T. H. Hendley,                         | .. | .. | .. | 19    | 10 | 0 |          |   |   |
| E. V. Westmacott, Esq.,                    | .. | .. | .. | 3     | 4  | 0 |          |   |   |
| S. Kurz, Esq.,                             | .. | .. | .. | 122   | 0  | 0 |          |   |   |
| O. Grant, Esq.,                            | .. | .. | .. | 0     | 11 | 0 |          |   |   |
| M. L. Dames, Esq.,                         | .. | .. | .. | 0     | 3  | 0 |          |   |   |
| Lt.-Col. J. Burn,                          | .. | .. | .. | 2     | 10 | 0 |          |   |   |
| The Government North-Western Pro-          |    |    |    |       |    |   |          |   |   |
| vinces,                                    | .. | .. | .. | 13    | 8  | 0 |          |   |   |
| B. Quaritch, Esq.,                         | .. | .. | .. | 128   | 14 | 0 |          |   |   |
| Lt.-Col. Lord Lt. Kerr,                    | .. | .. | .. | 2     | 0  | 0 |          |   |   |
| V. A. Smith, Esq.,                         | .. | .. | .. | 2     | 7  | 0 |          |   |   |
| J. Beamou, Esq.,                           | .. | .. | .. | 20    | 0  | 0 |          |   |   |
| F. S. Growse, Esq.,                        | .. | .. | .. | 2     | 0  | 0 |          |   |   |
| H. F. Blanford, Esq.,                      | .. | .. | .. | 3     | 4  | 9 |          |   |   |
| A. S. Harrison, Esq.,                      | .. | .. | .. | 3     | 0  | 0 |          |   |   |
| Col. W. E. Marshall,                       | .. | .. | .. | 1     | 15 | 0 |          |   |   |
| W. Stokes, Esq.,                           | .. | .. | .. | 1     | 14 | 0 |          |   |   |
| J. G. Dolmerick, Esq.,                     | .. | .. | .. | 1     | 0  | 0 |          |   |   |
| Col. H. L. Thuillier,                      | .. | .. | .. | 0     | 3  | 0 |          |   |   |
| Braj Bhushan Das,                          | .. | .. | .. | 0     | 0  | 3 |          |   |   |
| The Hon'ble Sir E. C. Bayloy, K. C. S. I., | .. | .. | .. | 1     | 8  | 0 |          |   |   |
|                                            |    |    |    |       |    |   | 4,122    | 3 | 0 |
|                                            |    |    |    |       |    |   | 2,307    | 0 | 1 |

Carried over, Rs. 1,87,008 8 9

| DISBURSEMENTS.                                                                                                     |  |  |  | 1876.                | 1876.        |
|--------------------------------------------------------------------------------------------------------------------|--|--|--|----------------------|--------------|
| Brought over, Rs.                                                                                                  |  |  |  | 1,60,962 12 10       | 17,492 12 1  |
| Paid ditto Brokerage on ditto                                                                                      |  |  |  | 6 4 0                |              |
| Ditto Fee for renewing Government Securities, ..                                                                   |  |  |  | 3 0 0                |              |
|                                                                                                                    |  |  |  | <u>1,60,962 0 10</u> | 4,073 9 8    |
| BUILDING.                                                                                                          |  |  |  |                      |              |
| Paid House rate, ..                                                                                                |  |  |  | 372 0 0              |              |
| Ditto Police and Lighting rate, ..                                                                                 |  |  |  | 276 0 0              |              |
| Ditto Water rate, ..                                                                                               |  |  |  | 213 13 6             |              |
| Ditto making Drawing of the Asiatic Society's Premises, ..                                                         |  |  |  | 13 14 0              |              |
| Ditto J. B. Norton, Esq., for supplying and fixing Gas Pipes, ..                                                   |  |  |  | 762 6 0              |              |
| Ditto ditto 96 Jets for ditto ditto with Pipe and Cocks complete in the Meeting room, ..                           |  |  |  | 401 6 0              |              |
| Ditto Messrs. Mackintosh, Burn & Co., in part payment for repairing the Society's Premises, ..                     |  |  |  | 8,000 0 0            |              |
|                                                                                                                    |  |  |  | <u>10,039 7 6</u>    | 1,008 12 7   |
| COIN FUND.                                                                                                         |  |  |  |                      |              |
| Purchase of Silver Coins, ..                                                                                       |  |  |  | 39 0 0               |              |
| Ditto of two Gold Coins, ..                                                                                        |  |  |  | 41 10 0              |              |
| Paid Cooley and Cart for bringing a Coin box from the Mint, ..                                                     |  |  |  | 0 7 0                |              |
| Ditto Banghy Expense for sending a packet of Gold Coins to W. Campbell, Esq., Beerbhoom, ..                        |  |  |  | 0 4 0                |              |
| Ditto fee for getting Money Order, ..                                                                              |  |  |  | 0 4 0                |              |
| Ditto Insufficient Postage on Packet of Gold Coin, ..                                                              |  |  |  | 0 4 0                |              |
|                                                                                                                    |  |  |  | <u>81 13 0</u>       | 376 4 0      |
| DR. OLDHAM MEMORIAL FUND.                                                                                          |  |  |  |                      |              |
| Paid Printing charges, 370 Copies of Circular, ..                                                                  |  |  |  | 11 0 0               |              |
| Ditto Advertising the List of Subscribers to the Fund, ..                                                          |  |  |  | 14 8 0               |              |
|                                                                                                                    |  |  |  | <u>25 8 0</u>        |              |
| DR. STOLICZKA MEMORIAL FUND.                                                                                       |  |  |  |                      |              |
| Remitted to A. Grote, Esq., London, 3 Overland Money Orders Nos. 143 to 145, dated 10th July 1876, @ £ 10 each, .. |  |  |  | 395 3 3              |              |
| Ditto ditto 2 Overland Money Orders Nos. 161 and 162, dated 17th July 1876, @ £ 10 each, ..                        |  |  |  | 203 7 6              |              |
|                                                                                                                    |  |  |  | <u>658 10 9</u>      | 1,733 14 4   |
| PIDDINGTON FUND.                                                                                                   |  |  |  |                      |              |
| Refunded to Capt. W. J. A. Wallace, being half his Subscription to the above Fund, ..                              |  |  |  | 8 0 0                |              |
| Paid by Transfer to the Piddington Pension Fund, ..                                                                |  |  |  | 578 4 0              |              |
|                                                                                                                    |  |  |  | <u>586 4 0</u>       |              |
| PIDDINGTON PENSION FUND.                                                                                           |  |  |  |                      |              |
| Paid to the Bank of Bengal for Purchase of 5½ per cent., Government Security No. 047143—021980, of 1859-80, ..     |  |  |  | 500 0 0              |              |
|                                                                                                                    |  |  |  | <u>500 0 0</u>       | 1,79,846 8 2 |
| Carried over, Rs.                                                                                                  |  |  |  |                      |              |

| RECEIPTS.                       | 1876.              | 1875. |
|---------------------------------|--------------------|-------|
| Brought over, It <sup>s</sup> . | 1,87,008    8    9 |       |

Carried over, Rs. 1,87,008    8    9

| DISBURSEMENTS.                                                                                                               |         | 1876.        | 1875. |
|------------------------------------------------------------------------------------------------------------------------------|---------|--------------|-------|
| Brought over, Rs.                                                                                                            | 500 0 0 | 1,79,846 8 2 |       |
| Paid Interest on ditto from 30th Nov. 1875 to 7th September, 1876, being 9 months, and 7 days @ $5\frac{1}{2}$ per cent., .. | 21 2 6  |              |       |
| Ditto Premium on ditto @ $1\frac{1}{2}$ per cent., ..                                                                        | 22 8 0  |              |       |
| Ditto Commission ditto @ $\frac{1}{2}$ per cent., ..                                                                         | 1 5 0   |              |       |
| Refunded to R. Taylor, Esq., half his Subscription to the Fund, ..                                                           | 15 0 0  |              |       |
| Paid Commission on Collecting Interest on Government Security, ..                                                            | 0 0 7   |              |       |
|                                                                                                                              |         | 560 0 10     |       |

MISCELLANEOUS.

|                                                                  |           |              |  |
|------------------------------------------------------------------|-----------|--------------|--|
| Paid donation towards a Zoological Exploration of Tonasserim, .. | 500 0 0   |              |  |
| Fund Account, ..                                                 | 1,130 0 0 |              |  |
| O. P. Fund, ..                                                   | 36 5 9    |              |  |
| Earth Current Account, ..                                        | 18 0 0    |              |  |
| Lt.-Col. C. C. Minchin, ..                                       | 1 0 0     |              |  |
| J. Boones, Esq., ..                                              | 1 9 0     |              |  |
| Capt. E. Fraser, ..                                              | 0 8 0     |              |  |
| M. Macauliffe, Esq., ..                                          | 3 12 0    |              |  |
| J. G. Delmerick, Esq., ..                                        | 0 10 0    |              |  |
| F. S. Growse, Esq., ..                                           | 3 14 0    |              |  |
| Money Lal Bysack, ..                                             | 110 14 6  |              |  |
| Jadubindo Bysack, ..                                             | 445 12 0  |              |  |
| The Government North Western Provinces, ..                       | 8 5 0     |              |  |
| Major W. R. M. Holroyd, ..                                       | 2 4 0     |              |  |
| L. Schwondlor, Esq., ..                                          | 9 7 0     |              |  |
| G. Nevill, Esq., ..                                              | 6 11 9    |              |  |
| Dr. G. Thibaut, ..                                               | 26 2 6    |              |  |
| Dr. F. Kellhorn, ..                                              | 1 2 0     |              |  |
| J. W. Edgar, Esq., ..                                            | 1 15 0    |              |  |
| Dr. T. H. Hondley, ..                                            | 19 10 0   |              |  |
| G. H. Damant, Esq., ..                                           | 0 12 0    |              |  |
| Capt. C. J. F. S. Forbes, ..                                     | 3 12 9    |              |  |
| L. H. Guffin, Esq., ..                                           | 1 7 0     |              |  |
| Lt.-Col. J. Burn, ..                                             | 50 10 0   |              |  |
| S. Kurz, Esq., ..                                                | 122 0 0   |              |  |
| The Hon'ble C. R. Lindsay, ..                                    | 0 11 0    |              |  |
| C. Grant, Esq., ..                                               | 0 11 0    |              |  |
| H. W. Dashwood, Esq., ..                                         | 0 11 0    |              |  |
| Maulavi Syad Jamadali, ..                                        | 0 11 0    |              |  |
| M. Saahagiri Sastri, ..                                          | 0 11 0    |              |  |
| H. H. the Rao of Kutch, ..                                       | 0 11 0    |              |  |
| V. A. Smith, Esq., ..                                            | 1 11 0    |              |  |
| Major H. H. Godwin-Austen, ..                                    | 2 12 0    |              |  |
| W. Stokes, Esq., ..                                              | 1 14 0    |              |  |
| Babullah Duftery, ..                                             | 10 0 0    |              |  |
| W. Irvine, Esq., ..                                              | 6 9 6     |              |  |
| W. J. Porter, Esq., ..                                           | 0 4 0     |              |  |
| Major-General A. Cunningham, C. S. I., ..                        | 0 8 0     |              |  |
| The Hon'ble Sir E. C. Bayley, C. S. I., ..                       | 1 8 0     |              |  |
| C. J. Lyall, Esq., ..                                            | 0 1 0     |              |  |
| W. McGregor, Esq., ..                                            | 2 7 6     |              |  |
| C. E. B. Girdlestone, Esq., ..                                   | 1 9 0     |              |  |
| The Rev. F. Foulkes, ..                                          | 1 2 0     |              |  |
| E. Lethbridge, Esq., ..                                          | 3 3 0     |              |  |
| Raja Joykissen Doss, ..                                          | 0 3 0     |              |  |
| Carried over, Rs.                                                | 2,597 6 3 | 1,80,406 9 0 |  |

| RECEIPTS.         | 1876.        | 1875. |
|-------------------|--------------|-------|
| Brought over, Rs. | 1,87,008 8 9 |       |

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Rs. 1,87,008 8 9

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Examined and found correct,

DAVID WALDIE,

H. H. GODWIN-AUSTEN, *Major*.

ASIATIC SOCIETY'S ROOMS,

*Calcutta, Jan. 1st, 1877.*

XXV

| DISBURSEMENTS.              |     |       |         | 1876.            | 1875.        |
|-----------------------------|-----|-------|---------|------------------|--------------|
| Brought over, Rs.           |     |       |         | 2,597 6 3        | 1,80,406 9 0 |
| Lt.-Col. L. R. Kerr,        | ..  | ..    | 0 4 0   |                  |              |
| Col. H. L. Thuillier,       | ..  | ..    | 0 3 0   |                  |              |
| M. L. Dames, Esq.,          | ..  | ..    | 0 16 0  |                  |              |
| Dr. J. Scully,              | ..  | ..    | 2 0 0   |                  |              |
| H. F. Blanford, Esq.,       | ..  | ..    | 14 5 6  |                  |              |
| E. H. Man, Esq.,            | ..  | ..    | 0 3 0   |                  |              |
| Dr. T. R. Lewis,            | ..  | ..    | 0 4 0   |                  |              |
| Dr. V. Richards,            | ..  | ..    | 0 5 0   |                  |              |
| A. S. Harrison, Esq.,       | ..  | ..    | 2 10 0  |                  |              |
| Md. Khodabux Khan,          | ..  | ..    | 0 10 0  |                  |              |
| W. T. Blanford, Esq.,       | ..  | ..    | 4 6 0   |                  |              |
| H. Buckle, Esq.,            | ..  | ..    | 0 11 0  |                  |              |
| A. Anderson, Esq.,          | ..  | ..    | 0 1 0   |                  |              |
| R. B. Shaw, Esq.,           | ..  | ..    | 9 11 0  |                  |              |
|                             |     |       |         | <hr/>            |              |
| BALANCE.                    |     |       |         |                  | 2,633 14 9   |
| In the Bank of Bengal, viz. |     |       |         |                  | 1,947 5 4    |
| Account of Stoliczka Memo-  |     |       |         |                  |              |
| rial Fund, ..               | 334 | 10    | 5       |                  |              |
| Account of Dr. Oldham       |     |       |         |                  |              |
| Memorial Fund, ..           | 130 | 8     | 0       |                  |              |
| Account of Piddington       |     |       |         |                  |              |
| Pension Fund, ..            | 70  | 11    | 2       |                  |              |
| Account of Asiatic Society  |     |       |         |                  |              |
| of Bengal, ...              | ..  | 3,213 | 13 2    |                  |              |
|                             |     |       |         | <hr/>            |              |
|                             |     |       |         | 3,749 10 9       |              |
| Cash in hand,               | ..  | ..    | 218 6 3 |                  |              |
|                             |     |       |         | <hr/>            |              |
|                             |     |       |         | 3,968 1 0        |              |
|                             |     |       |         | <hr/>            |              |
|                             |     |       |         | Rs. 1,87,008 8 9 |              |
|                             |     |       |         | <hr/>            |              |

Examined and found correct,

DAVID WALDIE,

H. H. GODWIN-AUSTEN, Major.

# STATEMENT, *Abstract of the Cash Account,*

|                                                                                             | RECEIPTS.         | 1876.     | 1875. |
|---------------------------------------------------------------------------------------------|-------------------|-----------|-------|
| <b>BALANCE OF 1875.</b>                                                                     |                   |           |       |
| In the Bank of Bengal, <i>vis.</i>                                                          |                   |           |       |
| Dr. J. Muir, ..                                                                             | 898 10 0          |           |       |
| O. P. Fund, ..                                                                              | 3,364 8 6         |           |       |
|                                                                                             | <u>4,263 2 6</u>  |           |       |
| Cash in hand, ..                                                                            | 144 7 5           |           |       |
|                                                                                             | <u>4,407 0 11</u> |           |       |
| <b>ORIENTAL PUBLICATIONS.</b>                                                               |                   |           |       |
| Received by sale of Bibliotheca Indica, and                                                 |                   |           |       |
| by Subscription to ditto, ..                                                                | 2,441 11 9        |           |       |
| Ditto Refund of Postage and Packing, ..                                                     | 65 9 6            |           |       |
| Ditto Commission on Purchase of Postage Stamps, ..                                          | 0 8 0             |           |       |
|                                                                                             | <u>2,507 13 3</u> |           |       |
|                                                                                             |                   | 2,872 6 3 |       |
| <b>GOVERNMENT ALLOWANCE.</b>                                                                |                   |           |       |
| Received from General Treasury at 500 Rs. per month, ..                                     |                   |           |       |
|                                                                                             | 6,000 0 0         |           |       |
| Ditto ditto Additional grant for the publication of Sanskrit Works at 250 Rs. per month, .. |                   |           |       |
|                                                                                             | 3,000 0 0         |           |       |
|                                                                                             | <u>9,000 0 0</u>  |           |       |
|                                                                                             |                   | 9,000 0 0 |       |
| <b>CUSTODY OF ORIENTAL WORKS.</b>                                                           |                   |           |       |
| Saving of Salary, ..                                                                        | 30 6 3            |           |       |
| Ditto Fine, ..                                                                              | 0 8 0             |           |       |
|                                                                                             | <u>30 14 3</u>    |           |       |
|                                                                                             |                   | 2 2 9     |       |
| Asiatic Society of Bengal, ..                                                               | 86 5 9            |           |       |
| Babu Braj Bhushana Das, ..                                                                  | 49 10 6           |           |       |
| Basel Mission Book Tract Depository, ..                                                     | 5 1 0             |           |       |
| T. W. H. Tolbort, Esq., ...                                                                 | 5 14 0            |           |       |
| Babu Pratapa Chandra Ghosh, ..                                                              | 30 14 3           |           |       |
| Sheoprasad Sadur, ..                                                                        | 2 7 0             |           |       |
| Adhur Sing Gour, ..                                                                         | 0 5 0             |           |       |
| Gopal Rao Hurry, Esq., ..                                                                   | 3 0 0             |           |       |
| Capt. G. A. Jacob, ..                                                                       | 0 1 0             |           |       |
| Ramjeebun Mookerjee, ..                                                                     | 15 0 0            |           |       |
| Venkata Krishna Modolier, ..                                                                | 0 11 0            |           |       |
| Framjee Cowasjee Institute Native General Library, Bombay, ..                               | 6 2 0             |           |       |
| Pandit Chandra Kant Tarkalankar, ..                                                         | 1 2 0             |           |       |
| Babu Kaliprasad, ..                                                                         | 12 15 0           |           |       |
|                                                                                             | <u>219 8 6</u>    |           |       |
|                                                                                             |                   | 293 5 5   |       |

Carried over, Rs. 16,165 13 11



## No. 2.

*Oriental Publication Fund, 1876.*

| DISBURSEMENTS.                                                 |    |    | 1876.      | 1875.      |
|----------------------------------------------------------------|----|----|------------|------------|
| <b>ORIENTAL PUBLICATIONS.</b>                                  |    |    |            |            |
| Paid Packing charges,                                          | .. | .. | 11 12 0    |            |
| Ditto Postage Stamps,                                          | .. | .. | 137 8 0    |            |
| Ditto Freight,                                                 | .. | .. | 85 6 0     |            |
| Ditto Advertising charges,                                     | .. | .. | 202 1 0    |            |
| Ditto Commission on Sale of Books, &c.,                        | .. | .. | 33 12 0    |            |
| Ditto Coolies for removing Books and Shelves, &c.,             | .. | .. | 47 5 0     |            |
| Ditto Tiooa Duftery for arranging Bibliotheca Indica,          | .. | .. | 9 4 0      |            |
| Ditto Carpenters' workmanship and supplying Rafters for Racks, | .. | .. | 36 2 0     |            |
| Purchase of three Teakwood Racks,                              | .. | .. | 183 0 0    |            |
| Ditto Petty charges,                                           | .. | .. | 7 11 9     |            |
|                                                                |    |    | <hr/>      |            |
|                                                                |    |    | 753 13 9   | 774 1 0    |
| <b>CUSTODY OF ORIENTAL WORKS.</b>                              |    |    |            |            |
| Paid Salary of the Librarian,                                  | .. | .. | 600 0 0    |            |
| Ditto Establishment,                                           | .. | .. | 724 0 0    |            |
| Ditto Fee for Stamping Cheques,                                | .. | .. | 3 2 0      |            |
| Ditto Banghy Expenses,                                         | .. | .. | 0 10 0     |            |
| Ditto Book Binding,                                            | .. | .. | 1 0 0      |            |
| Ditto Packing charges,                                         | .. | .. | 3 0 0      |            |
| Ditto Petty charges,                                           | .. | .. | 1 0 0      |            |
|                                                                |    |    | <hr/>      |            |
|                                                                |    |    | 1,332 12 0 | 1,291 2 0  |
| <b>LIBRARY.</b>                                                |    |    |            |            |
| Paid Purchase of MSS.,                                         | .. | .. | 70 0 0     |            |
|                                                                |    |    | <hr/>      |            |
|                                                                |    |    | 70 0 0     | 6 6 6      |
| <b>CATALOGUE OF SANSKRIT MSS.</b>                              |    |    |            |            |
| Paid Salary for Cataloguing Sanskrit MSS.,                     | .. | .. | 420 0 0    |            |
|                                                                |    |    | <hr/>      |            |
|                                                                |    |    | 420 0 0    | 360 0 0    |
| <b>COPYING MANUSCRIPTS.</b>                                    |    |    |            |            |
| Paid Copying MSS.,                                             | .. | .. | 16 6 6     |            |
|                                                                |    |    | <hr/>      |            |
|                                                                |    |    | 14 6 6     | 157 0 3    |
| <b>AKH-I-AKBARÍ.</b>                                           |    |    |            |            |
| Paid Editing and Printing charges,                             | .. | .. | 445 0 0    |            |
|                                                                |    |    | <hr/>      |            |
|                                                                |    |    | 445 0 0    | 96 0 0     |
| <b>GORHILÍYA GRINHA SU'TRA.</b>                                |    |    |            |            |
| Paid Printing charges,                                         | .. | .. | 224 0 0    |            |
| Ditto Postage,                                                 | .. | .. | 0 13 0     |            |
|                                                                |    |    | <hr/>      |            |
|                                                                |    |    | 224 13 0   | 140 5 0    |
| <b>SÁHITYA DARPAṆA.</b>                                        |    |    |            |            |
| Paid Printing charges,                                         | .. | .. | 418 0 0    |            |
|                                                                |    |    | <hr/>      |            |
|                                                                |    |    | 418 0 0    | 0 6 0      |
| <b>AKHARÁWAN.</b>                                              |    |    |            |            |
| Paid Editing charges,                                          | .. | .. | 192 0 0    |            |
|                                                                |    |    | <hr/>      |            |
|                                                                |    |    | 192 0 0    | 688 0 0    |
| <b>SÁMA VEDA.</b>                                              |    |    |            |            |
| Paid Editing and Printing charges,                             | .. | .. | 2,100 8 9  |            |
|                                                                |    |    | <hr/>      |            |
|                                                                |    |    | 2,100 8 9  | 1,220 10 0 |
| Carried over, Rs.                                              |    |    | 5,971 6 0  |            |

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| RECEIPTS.         | 1876.        | 1875. |
|-------------------|--------------|-------|
| Brought over, Rs. | 16,165 13 11 |       |

Rs. 16,165 13 11

Examined and found correct.

DAVID WALDRN,  
H. H. GODWIN-AUSTEN, *Major*.

ASIATIC SOCIETY'S ROOMS,  
*Calcutta, Jan. 1st, 1876.*

DISBURSEMENTS.

1876.

1875.

Brought over, Rs. 5,971 6 0

BIOGRAPHICAL DICTIONARY OF PERSONS

WHO KNEW MUHAMMAD.

Paid Editing and Printing charges, .. 710 8 0

Ditto Copying charges, .. 127 8 0

838 0 0 25 0 0

AITAREYA KHANYAKA.

Paid Editing and Printing charges, .. 1,536 11 9

1,536 11 9 353 0 0

CHATURVARGA CHINTÁMANI.

Paid Editing and Printing charges, .. 1,220 0 0

1,220 0 0 610 0 0

TANAGAT-I-NAQIBI.

Paid Printing charges, .. 1,079 10 6

Ditto Freight, .. 5 0 0

Ditto Postage and Cooley, .. 0 11 0

1,085 5 6 2 12 0

BULÁMATÍ.

Paid Printing charges, .. 498 0 0

Ditto Freight, .. 16 6 0

Ditto Postage and Cooley, .. 1 3 3

515 9 3

TAITTIRIYA SÁNHITÁ.

Paid Editing and Printing charges, .. 334 10 0

334 10 0

KÁMANDAKÍ NÍTISÁKA.

Paid Editing and Printing charges, .. 320 0 0

320 0 0

Asiatic Society of Bengal, .. 1,086 5 9

Babu Braj Bhushan Das, .. 52 13 6

Basel Mission Book and Tract Depository, .. 5 1 0

Babu Bhatya Lala, .. 5 3 0

Adhur Sing Gour, .. 0 5 0

Ramjeebun Mookorjee, .. 30 0 0

Venkata Krishna Modoliar, .. 0 11 0

Framjee Cowasjee Institute Native General

Library, Bombay, .. 6 3 0

Rutton Lala, .. 1 6 0

Gopal Rao Hurry, .. 3 0 0

1,191 0 3 615 4 6

BALANCE.

In the Bank of Bengal, *viz.*

Dr. J. Muir, .. 898 10 0

O. P. Fund, .. 2,140 12 10

3,039 6 10

Cash in hand, .. 113 12 4

3,153 3 2

Rs. 16,165 13 11

Examined and found correct.

DAVID WALDEN,

H. H. GODWIN-AUSTIN, Major.

**STATEMENT,**  
*Conservation of Sanskrit MSS., in Account*

**Cr.**

|                                                                                                                       |                |
|-----------------------------------------------------------------------------------------------------------------------|----------------|
|                                                                                                                       | 1876.          |
| Balance of 1875, .....                                                                                                | Ra. 4,370 0 11 |
| Received from the Government of Bengal, the amount sanctioned towards the Conservation of Sanskrit MSS., being        |                |
| 2nd Half of 1875-76, .....                                                                                            | 1,600 0 0      |
| Ditto ditto 1st Half of 1876-77, .....                                                                                | 1,600 0 0      |
| Sale proceeds of 47 copies Notices of Sanskrit MSS., .....                                                            | 47 0 0         |
| Refund of the amount from Dr. Rajendralála Mitra, paid on the 14th September, 1875 for purchase of Sanskrit MSS. .... | 1,200 0 0      |
| Ditto Dr. from ditto ditto paid on the 8th September, 1876 for purchase of Sanskrit MSS., .....                       | 1,000 0 0      |
| Ditto of Postage Stamps, .....                                                                                        | 0 11 0         |
| Received from Bábu Nil Komul Banerjée in Deposit, .....                                                               | 0 4 0          |
|                                                                                                                       | 5,447 15 0     |

Ra. 9,817 15 11

**Examined and found correct.**

DAVID WAINER,  
H. H. GODWIN-AUSTEN, *Major.*

ASIANIC SOCIETY'S ROOMS,  
Calcutta, Jan. 1st, 1876.

## NO. 3.

*Current with the Asiatic Society of Bengal.*

Dr.

|                                                                                                                                                                  |       | 1876.                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|
| Paid Salary for preparing Catalogue of Sanskrit MSS.,                                                                                                            | 360   | 0 0                    |
| Ditto ditto for Translating the Sanskrit Catalogue, ....                                                                                                         | 240   | 0 0                    |
| Ditto ditto for Travelling Pandit, .....                                                                                                                         | 550   | 0 0                    |
| Ditto Banghy expenses, .....                                                                                                                                     | 2     | 4 0                    |
| Ditto Printing charges of Notices of Sanskrit MSS. Vol. III. Part III. and Vol. III. Part IV., .....                                                             | 687   | 8 0                    |
| Ditto Contingent charges for Travelling Pandit, .....                                                                                                            | 6     | 10 6                   |
| Ditto Travelling Allowance for ditto ditto, .....                                                                                                                | 169   | 14 0                   |
| Ditto Purchase of Sanskrit MSS., .....                                                                                                                           | 800   | 10 0                   |
| Ditto Copying charges of Sanskrit MSS., .....                                                                                                                    | 91    | 4 0                    |
| Ditto yellow paper for copying ditto, .....                                                                                                                      | 7     | 8 0                    |
| Ditto Fee to the Bank of Bengal for Stamping Cheques, .....                                                                                                      | 1     | 9 0                    |
| Ditto Purchase of Stationery, .....                                                                                                                              | 9     | 10 0                   |
| Ditto Packing charges, .....                                                                                                                                     | 3     | 6 0                    |
| Ditto Freight for sending Notices of Sanskrit MSS. to Messrs. Trübner and Co., .....                                                                             | 42    | 10 0                   |
| Ditto Postage Stamps, .....                                                                                                                                      | 21    | 11 6                   |
| Ditto Messrs. T. Black and Co. for preparing 13 plates and Lithographing and Coloring 510 copies of each of the above plates for Notices of Sanskrit MSS., ..... | 367   | 3 0                    |
| Ditto Dr. Rajendralála Mitra, as an advance on account of Travelling expenses for a Tour in search of Sanskrit MSS., .....                                       | 1,000 | 0 0                    |
| Ditto Librarian, his Salary from May 1876 to April 1876, .....                                                                                                   | 150   | 0 0                    |
| Ditto Dr. Rajendralála Mitra, for Travelling expenses to Patna, Benares, &c. including Railway fare, Carriage hire, &c., .....                                   | 346   | 10 0                   |
| Ditto Present by way of Commission to Pandits and others, .....                                                                                                  | 36    | 0 0                    |
| Ditto Packing Cases, Charges of Packing, Cooley, Boat-hire, and Railway fare for MSS., .....                                                                     | 13    | 3 6                    |
| Ditto for Copying and Purchase of 128 Copies of MSS., .....                                                                                                      | 1,669 | 4 0                    |
| Ditto Loan, to the Asiatic Society of Bengal, .....                                                                                                              | 1,000 | 0 0                    |
| Ditto Petty Charges, .....                                                                                                                                       | 7     | 9 6                    |
| Ditto Salary for Bearer, .....                                                                                                                                   | 84    | 0 0                    |
|                                                                                                                                                                  |       | <u>7,667 7 0</u>       |
| <b>BALANCE OF 1876.</b>                                                                                                                                          |       |                        |
| In the Bank of Bengal, .....                                                                                                                                     | 2,146 | 10 6                   |
| Cash in hand, .....                                                                                                                                              | 3     | 14 6                   |
|                                                                                                                                                                  |       | <u>2,150 8 11</u>      |
|                                                                                                                                                                  |       | <u>Rs. 9,817 15 11</u> |

Examined and found correct.

DAVID WALDIE,  
H. H. GODWIN-AUSTEN, Major.

ASIATIC SOCIETY'S ROOMS,  
Calcutta, Jan. 1st, 1876.

# STATEMENT NO. 4.

## Shewing the Assets and Liabilities of the Asiatic Society of Bengal on the 1st January, 1877.

| ASSETS.                              |                | 1876.         | 1875.        | LIABILITIES.                                       |           | 1876.          | 1875.       |
|--------------------------------------|----------------|---------------|--------------|----------------------------------------------------|-----------|----------------|-------------|
| In Bank of Bengal,...                | Ra. 3,749 10 9 |               | 3,858 2 3    | Salary and Establishment for December, 1876, ..... |           | 332 2 8        | 348 10 8    |
| Cash in hand, .....                  | 218 6 3        |               | 160 9 4      | Dr. Szoliczka Memorial Fund, .....                 |           | 234 10 5       | 812 5 2     |
| Government Securities,               |                | 3,968 1 0     |              | Dr. Oldham Memorial Fund, .....                    |           | 130 8 0        | 0 0 0       |
| Ditto ditto on account of Piddington |                | 1,53,000 0 0  | 0 13,200 0 0 | Piddington Pension Fund, .....                     |           | 70 11 2        | 0 0 0       |
| Pension Fund, .....                  |                | 600 0 0       |              | Baptist Mission Press, Prin-                       |           |                |             |
|                                      |                |               |              | ting charges, Journal,                             |           |                |             |
|                                      |                |               |              | Part II. No. III. of 1876, .....                   | 420 9 0   |                |             |
|                                      |                |               |              | Royal printing paper, ....                         | 9 9 9     |                |             |
|                                      |                | 1,57,468 1 0  | 17,218 11 7  |                                                    |           | 430 2 9        | 1,244 12 0  |
| OUTSTANDING.                         |                |               |              |                                                    |           |                |             |
| Admission fees, .....                |                | 160 0 0       | 32 0 0       | Oriental Gas Company Limited, Supplied             |           |                |             |
| Subscriptions, .....                 |                | 6,270 0 0     | 6,561 0 0    | Gas, .....                                         | 28 0 0    | 0 0 0          |             |
| Sale of Journal, .....               |                | 278 1 9       | 358 7 9      | Messrs. Llewellyn and Co., for furnishing          |           |                |             |
| Subscription ditto, .....            |                | 667 13 9      | 607 9 9      | Marble Tablet for bust, .....                      | 20 0 0    | 0 0 0          |             |
| Sale of Library, .....               |                | 162 9 0       | 152 9 0      | Statesman Press for advertising Monthly            |           |                |             |
|                                      |                |               |              | General Meeting, .....                             | 10 8 0    | 0 0 0          |             |
| Due by the Bank of Bengal Fund       |                | 7,438 8 6     | 7,711 10 6   | O. P. Fund on Loan, .....                          | 1,000 0 0 | 0 0 0          |             |
| Account, .....                       |                | 364 13 7      | 275 5 1      | Conservation of Sanskrit MSS. on Loan,             |           |                |             |
|                                      |                |               |              | to Asiatic Society, .....                          | 1,000 0 0 | 0 0 0          |             |
|                                      |                | Ra. 7,803 6 1 | 7,986 15 7   |                                                    |           | Ra. 3,356 11 0 | 2,405 11 10 |

We have examined this account and see no reason to doubt its correctness.

ASIATIC SOCIETY'S ROOMS,  
Calcutta, Jan. 1st, 1876.

DAVID WALDIE,  
H. H. GODWIN-AUSTEN, Major.

*Shewing the Assets and Liabilities of the Asiatic Society of Bengal, O. P. Fund, on the 1st January, 1877.*

**We have examined this account and see no reason to doubt its correctness.**

**AMERICAN SOCIETY'S ROOMS,  
Calcutta, Jan. 1st, 1876.**

**DAVID WALDER,  
H. H. GODWIN-AUSTIN, Major.**





*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1877.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dr. Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | °                             | °                                             | °    | °     |
| 1     | 30.068                                          | 30.144                                    | 30.015  | 0.129   | 65.5                          | 75.0                                          | 57.5 | 17.5  |
| 2     | .075                                            | .148                                      | .012    | .136    | 66.6                          | 76.6                                          | 58.5 | 18.1  |
| 3     | .082                                            | .161                                      | .039    | .122    | 66.8                          | 77.0                                          | 58.5 | 18.5  |
| 4     | .088                                            | .151                                      | .036    | .115    | 66.6                          | 77.0                                          | 58.9 | 18.1  |
| 5     | .095                                            | .152                                      | .051    | .101    | 66.8                          | 76.0                                          | 59.2 | 16.8  |
| 6     | .115                                            | .194                                      | .047    | .147    | 66.9                          | 76.6                                          | 59.0 | 17.6  |
| 7     | .110                                            | .187                                      | .063    | .124    | 68.9                          | 78.7                                          | 61.4 | 17.3  |
| 8     | .112                                            | .173                                      | .064    | .109    | 68.0                          | 77.2                                          | 59.2 | 18.0  |
| 9     | .110                                            | .194                                      | .037    | .157    | 68.2                          | 77.7                                          | 60.5 | 17.2  |
| 10    | .075                                            | .151                                      | .019    | .132    | 68.3                          | 78.0                                          | 60.4 | 17.6  |
| 11    | .093                                            | .168                                      | .034    | .134    | 69.0                          | 79.0                                          | 60.5 | 18.5  |
| 12    | .094                                            | .189                                      | .018    | .171    | 70.0                          | 79.8                                          | 62.2 | 17.6  |
| 13    | .092                                            | .153                                      | .029    | .124    | 65.4                          | 79.0                                          | 63.5 | 5.5   |
| 14    | .110                                            | .168                                      | .046    | .122    | 63.8                          | 67.3                                          | 61.3 | 6.0   |
| 15    | .176                                            | .242                                      | .181    | .111    | 64.2                          | 72.0                                          | 57.5 | 14.5  |
| 16    | .219                                            | .301                                      | .169    | .132    | 64.3                          | 70.5                                          | 60.5 | 10.0  |
| 17    | .188                                            | .260                                      | .136    | .124    | 65.8                          | 73.8                                          | 58.3 | 15.5  |
| 18    | .171                                            | .246                                      | .114    | .132    | 68.1                          | 77.0                                          | 60.5 | 16.5  |
| 19    | .172                                            | .251                                      | .124    | .127    | 68.7                          | 77.4                                          | 62.0 | 15.4  |
| 20    | .118                                            | .186                                      | .051    | .135    | 66.9                          | 74.0                                          | 60.6 | 13.4  |
| 21    | .069                                            | .142                                      | .017    | .125    | 67.0                          | 75.4                                          | 59.5 | 15.9  |
| 22    | .087                                            | .151                                      | .010    | .141    | 67.5                          | 76.6                                          | 60.5 | 16.1  |
| 23    | .105                                            | .177                                      | .049    | .128    | 65.4                          | 70.0                                          | 61.4 | 8.6   |
| 24    | .184                                            | .208                                      | .084    | .124    | 67.9                          | 78.5                                          | 59.4 | 19.1  |
| 25    | .080                                            | .102                                      | .015    | .147    | 68.3                          | 77.2                                          | 60.0 | 17.2  |
| 26    | .047                                            | .122                                      | 29.990  | .132    | 68.3                          | 70.5                                          | 60.2 | 10.3  |
| 27    | .078                                            | .159                                      | 30.038  | .126    | 69.0                          | 77.8                                          | 62.5 | 15.3  |
| 28    | .074                                            | .150                                      | .019    | .181    | 68.9                          | 78.3                                          | 60.5 | 17.8  |
| 29    | .015                                            | .089                                      | 29.955  | .134    | 70.7                          | 79.5                                          | 62.5 | 17.0  |
| 30    | 29.966                                          | .049                                      | .919    | .130    | 74.1                          | 83.0                                          | 68.5 | 14.5  |
| 31    | .983                                            | .068                                      | .908    | .160    | 72.0                          | 78.0                                          | 66.8 | 11.2  |

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means, are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1877.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew Point. | Mean Elastic force of vapour. | Mean Weight of Vapour in a Cubic foot of air. | Additional Weight of Vapour required for complete saturation. | Mean degree of Humidity, complete saturation being unity. |
|-------|----------------------------|---------------------|---------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
|       | °                          | °                   | °                   | °                         | Inches.                       | Gr.                                           | Gr.                                                           |                                                           |
| 1     | 59.1                       | 6.4                 | 54.0                | 11.5                      | 0.428                         | 4.74                                          | 2.24                                                          | 0.68                                                      |
| 2     | 60.8                       | 5.8                 | 56.2                | 10.4                      | .461                          | 5.11                                          | .10                                                           | .71                                                       |
| 3     | 61.1                       | 5.7                 | 56.5                | 10.3                      | .465                          | .15                                           | .11                                                           | .71                                                       |
| 4     | 60.9                       | 5.7                 | 56.3                | 10.3                      | .462                          | .13                                           | .08                                                           | .71                                                       |
| 5     | 60.9                       | 5.9                 | 56.2                | 10.6                      | .461                          | .10                                           | .16                                                           | .70                                                       |
| 6     | 60.6                       | 6.3                 | 55.0                | 11.3                      | .452                          | .01                                           | .27                                                           | .69                                                       |
| 7     | 61.8                       | 7.1                 | 56.1                | 12.8                      | .459                          | .00                                           | .68                                                           | .65                                                       |
| 8     | 61.3                       | 6.7                 | 55.9                | 12.1                      | .458                          | .04                                           | .49                                                           | .67                                                       |
| 9     | 61.3                       | 6.9                 | 55.8                | 12.4                      | .455                          | .03                                           | .55                                                           | .66                                                       |
| 10    | 62.4                       | 5.9                 | 57.7                | 10.6                      | .485                          | .31                                           | .26                                                           | .70                                                       |
| 11    | 63.0                       | 6.0                 | 58.2                | 10.8                      | .493                          | .43                                           | .33                                                           | .70                                                       |
| 12    | 64.1                       | 5.9                 | 59.4                | 10.0                      | .513                          | .03                                           | .37                                                           | .70                                                       |
| 13    | 64.1                       | 1.3                 | 63.1                | 2.8                       | .580                          | 6.44                                          | 0.51                                                          | .93                                                       |
| 14    | 62.2                       | 1.6                 | 60.8                | 3.0                       | .537                          | 5.98                                          | .63                                                           | .91                                                       |
| 15    | 60.8                       | 3.4                 | 57.7                | 6.5                       | .485                          | .38                                           | 1.31                                                          | .80                                                       |
| 16    | 61.1                       | 2.3                 | 58.2                | 6.1                       | .493                          | .48                                           | .24                                                           | .82                                                       |
| 17    | 62.8                       | 3.5                 | 59.5                | 6.3                       | .515                          | .71                                           | .33                                                           | .81                                                       |
| 18    | 63.8                       | 4.3                 | 60.4                | 7.7                       | .530                          | .85                                           | .70                                                           | .78                                                       |
| 19    | 63.4                       | 5.3                 | 59.2                | 9.5                       | .509                          | .62                                           | 2.07                                                          | .73                                                       |
| 20    | 61.2                       | 5.7                 | 56.6                | 10.3                      | .467                          | .17                                           | .11                                                           | .71                                                       |
| 21    | 61.3                       | 5.7                 | 56.7                | 10.3                      | .469                          | .18                                           | .12                                                           | .71                                                       |
| 22    | 61.5                       | 6.0                 | 56.7                | 10.8                      | .469                          | .17                                           | .25                                                           | .70                                                       |
| 23    | 61.4                       | 4.0                 | 58.2                | 7.2                       | .493                          | .47                                           | 1.48                                                          | .79                                                       |
| 24    | 62.7                       | 5.2                 | 58.5                | 9.4                       | .498                          | .50                                           | 2.01                                                          | .73                                                       |
| 25    | 61.7                       | 6.6                 | 56.4                | 11.9                      | .464                          | .11                                           | .49                                                           | .67                                                       |
| 26    | 62.4                       | 5.9                 | 57.7                | 10.6                      | .485                          | .34                                           | .26                                                           | .70                                                       |
| 27    | 62.9                       | 6.1                 | 58.0                | 11.0                      | .489                          | .39                                           | .37                                                           | .70                                                       |
| 28    | 62.2                       | 6.7                 | 56.8                | 12.1                      | .470                          | .19                                           | .56                                                           | .67                                                       |
| 29    | 66.3                       | 4.4                 | 62.5                | 7.9                       | .574                          | 6.31                                          | 1.87                                                          | .77                                                       |
| 30    | 70.3                       | 3.8                 | 67.6                | 6.5                       | .672                          | 7.34                                          | .73                                                           | .81                                                       |
| 31    | 68.8                       | 3.2                 | 66.2                | 5.8                       | .642                          | .03                                           | .47                                                           | .68                                                       |

All the Hygrometrical elements are computed by the Greenwich Constants,

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1877.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer at<br>32° Falt. | Range of the Barometer<br>for each hour during<br>the month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture for each hour<br>during the month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|------------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                             | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | o                             | o                                                                | o    | o     |
| Mid-<br>night. | 30.105                                          | 30.217                                                       | 29.969  | 0.248   | 64.6                          | 72.5                                                             | 61.0 | 11.5  |
| 1              | .096                                            | .207                                                         | .957    | .250    | 63.9                          | 71.0                                                             | 60.5 | 10.5  |
| 2              | .085                                            | .216                                                         | .947    | .269    | 63.2                          | 69.2                                                             | 60.0 | 9.2   |
| 3              | .077                                            | .199                                                         | .933    | .266    | 62.6                          | 69.0                                                             | 59.5 | 9.5   |
| 4              | .070                                            | .185                                                         | .936    | .249    | 62.1                          | 68.7                                                             | 59.0 | 9.7   |
| 5              | .081                                            | .190                                                         | .958    | .232    | 61.5                          | 68.5                                                             | 58.5 | 10.0  |
| 6              | .096                                            | .198                                                         | .990    | .208    | 61.0                          | 68.5                                                             | 58.0 | 10.5  |
| 7              | .116                                            | .206                                                         | 30.004  | .202    | 60.9                          | 68.8                                                             | 57.5 | 11.3  |
| 8              | .142                                            | .239                                                         | .007    | .232    | 62.5                          | 70.0                                                             | 59.0 | 11.0  |
| 9              | .165                                            | .277                                                         | .046    | .231    | 66.1                          | 71.5                                                             | 62.7 | 8.8   |
| 10             | .170                                            | .301                                                         | .049    | .252    | 69.1                          | 74.5                                                             | 64.0 | 10.5  |
| 11             | .152                                            | .288                                                         | .023    | .265    | 71.6                          | 77.0                                                             | 64.0 | 13.0  |
| Noon.          | .120                                            | .267                                                         | 29.990  | .277    | 73.3                          | 78.6                                                             | 65.2 | 13.4  |
| 1              | .087                                            | .223                                                         | .959    | .264    | 74.5                          | 80.0                                                             | 65.5 | 14.5  |
| 2              | .083                                            | .193                                                         | .930    | .263    | 75.5                          | 81.0                                                             | 65.2 | 15.8  |
| 3              | .048                                            | .169                                                         | .917    | .252    | 75.8                          | 83.0                                                             | 64.9 | 18.1  |
| 4              | .043                                            | .176                                                         | .908    | .268    | 74.7                          | 82.0                                                             | 64.0 | 18.0  |
| 5              | .060                                            | .169                                                         | .919    | .250    | 73.6                          | 80.8                                                             | 64.0 | 16.8  |
| 6              | .061                                            | .187                                                         | .931    | .256    | 71.1                          | 78.8                                                             | 64.0 | 14.8  |
| 7              | .075                                            | .205                                                         | .934    | .271    | 69.4                          | 76.0                                                             | 64.0 | 12.0  |
| 8              | .092                                            | .227                                                         | .963    | .204    | 68.2                          | 74.6                                                             | 63.0 | 11.6  |
| 9              | .108                                            | .250                                                         | .958    | .292    | 67.1                          | 75.5                                                             | 62.5 | 11.0  |
| 10             | .109                                            | .252                                                         | .960    | .292    | 66.2                          | 72.5                                                             | 62.2 | 10.3  |
| 11             | .107                                            | .232                                                         | .951    | .281    | 65.5                          | 72.0                                                             | 61.3 | 10.7  |

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means, are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1877.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

| Hour.          | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a Cubic foot of air. | Additional Weight of<br>Vapour required for<br>complete saturation. | Mean degree of Humi-<br>dity, complete satura-<br>tion being unity. |
|----------------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|                | °                               | °                   | °                   | °                            | Inches.                          | Gr.                                              | Gr.                                                                 |                                                                     |
| Mid-<br>night. | 61.7                            | 2.9                 | 59.4                | 5.2                          | 0.513                            | 5.70                                             | 1.08                                                                | 0.84                                                                |
| 1              | 61.1                            | 2.8                 | 58.6                | 5.3                          | .499                             | .56                                              | .07                                                                 | .84                                                                 |
| 2              | 60.6                            | 2.6                 | 58.3                | 4.9                          | .494                             | .50                                              | 0.99                                                                | .85                                                                 |
| 3              | 60.1                            | 2.5                 | 57.8                | 4.8                          | .486                             | .43                                              | .94                                                                 | .85                                                                 |
| 4              | 59.6                            | 2.5                 | 57.3                | 4.8                          | .478                             | .34                                              | .93                                                                 | .85                                                                 |
| 5              | 59.3                            | 2.2                 | 57.3                | 4.2                          | .478                             | .35                                              | .81                                                                 | .87                                                                 |
| 6              | 59.0                            | 2.0                 | 57.2                | 3.8                          | .476                             | .33                                              | .73                                                                 | .88                                                                 |
| 7              | 58.8                            | 2.1                 | 56.9                | 4.0                          | .472                             | .28                                              | .76                                                                 | .87                                                                 |
| 8              | 60.2                            | 2.3                 | 58.1                | 4.4                          | .491                             | .49                                              | .86                                                                 | .87                                                                 |
| 9              | 62.1                            | 4.0                 | 58.9                | 7.2                          | .504                             | .59                                              | 1.51                                                                | .79                                                                 |
| 10             | 63.2                            | 5.9                 | 58.5                | 10.6                         | .498                             | .48                                              | 2.30                                                                | .70                                                                 |
| 11             | 64.0                            | 7.6                 | 57.9                | 13.7                         | .488                             | .34                                              | 3.06                                                                | .64                                                                 |
|                |                                 |                     |                     |                              |                                  |                                                  |                                                                     |                                                                     |
| Noon.          | 64.4                            | 8.9                 | 57.3                | 16.0                         | .478                             | .22                                              | .62                                                                 | .59                                                                 |
| 1              | 64.7                            | 9.8                 | 57.8                | 16.7                         | .486                             | .29                                              | .89                                                                 | .58                                                                 |
| 2              | 65.1                            | 10.4                | 57.8                | 17.7                         | .486                             | .23                                              | 4.18                                                                | .56                                                                 |
| 3              | 65.1                            | 10.7                | 57.6                | 18.2                         | .483                             | .24                                              | .80                                                                 | .55                                                                 |
| 4              | 64.4                            | 10.3                | 57.2                | 17.5                         | .476                             | .18                                              | .05                                                                 | .56                                                                 |
| 5              | 64.9                            | 8.7                 | 58.8                | 14.8                         | .503                             | .43                                              | 3.45                                                                | .61                                                                 |
| 6              | 64.7                            | 6.4                 | 59.6                | 11.5                         | .516                             | .66                                              | 2.62                                                                | .68                                                                 |
| 7              | 64.5                            | 4.9                 | 60.6                | 8.8                          | .534                             | .87                                              | 1.99                                                                | .75                                                                 |
| 8              | 63.9                            | 4.3                 | 60.5                | 7.7                          | .532                             | .87                                              | .71                                                                 | .77                                                                 |
| 9              | 63.3                            | 3.8                 | 60.3                | 6.8                          | .528                             | .85                                              | .47                                                                 | .80                                                                 |
| 10             | 62.8                            | 3.4                 | 60.1                | 6.1                          | .525                             | .82                                              | .30                                                                 | .82                                                                 |
| 11             | 62.5                            | 3.0                 | 60.1                | 5.4                          | .525                             | .83                                              | .15                                                                 | .84                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1877.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 1½ ft. above Ground. | WIND.                 |                |                 | General aspect of the Sky.                                                                                             |
|-------|-----------------------|---------------------------------|-----------------------|----------------|-----------------|------------------------------------------------------------------------------------------------------------------------|
|       |                       |                                 | Prevailing direction. | Max. Pressure. | Daily Velocity. |                                                                                                                        |
|       |                       | Inches                          |                       | lb.            | Miles.          |                                                                                                                        |
| 1     | 128.0                 | ...                             | N N W & N             | ...            | 121.5           | B to 11 A. M., \i to 3, B to 11 P. M.                                                                                  |
| 2     | 127.5                 | ...                             | N & N N E             | ...            | 112.0           | B. Foggy at 9 P. M.                                                                                                    |
| 3     | 107.5                 | ...                             | S & S by W            | ...            | 48.0            | B.                                                                                                                     |
| 4     | 128.0                 | ...                             | S by E & S S W        | ...            | 68.4            | B to 7 A. M., \i to 12, \ to 5, B to 11 P. M.                                                                          |
| 5     | 127.5                 | ...                             | S by W & W S W        | ...            | 43.6            | B to 11 A. M., \i to 5, B to 11 P. M. Slightly foggy from 8 to 11 P. M.                                                |
| 6     | 123.0                 | ...                             | W S W & N by E        | ...            | 82.0            | B. Foggy at midnight.                                                                                                  |
| 7     | 127.8                 | ...                             | N by E & N            | ...            | 71.3            | B to 1, \i to 3, B to 11 P. M.                                                                                         |
| 8     | 114.8                 | ...                             | N & W by N            | ...            | 88.3            | B to 2, \i to 5, B to 11 P. M.                                                                                         |
| 9     | ...                   | ...                             | W by N & N            | ...            | 101.5           | B.                                                                                                                     |
| 10    | ...                   | ...                             | N & S S W             | ...            | 48.5            | B. Slightly foggy at 5 & 6 A. M. & 8 & 9 P. M.                                                                         |
| 11    | ...                   | ...                             | S S W & E             | ...            | 31.8            | B to 3, \i to 5, B to 11 P. M.                                                                                         |
| 12    | ...                   | 0.06                            | S by E & S            | ...            | 73.7            | B to 4 A. M., \i to 3, \i to 8, O to 11 P. M. Light R at 7 & 11 P. M.                                                  |
| 13    | Out of order          | 1.94                            | S E                   | ...            | 143.2           | O. T at 10½ A. M. B from Midnight to 4 P. M.                                                                           |
| 14    | ...                   | ...                             | ...                   | ...            | 174.6           | O to 5, B to 11 P. M. D at 7, 10 & 11 A. M.                                                                            |
| 15    | ...                   | ...                             | N by E                | ...            | 141.3           | B to 6 A. M., \i to 7, B to 11 P. M. Slightly foggy at 8 & 9 P. M.                                                     |
| 16    | ...                   | 0.03                            | N by E & N E          | ...            | 191.2           | B to 1, \i to 4, O to 10 A. M., \i to 3, \i to 5, B to 11 P. M. Slightly foggy at 7 & 8 P. M. Light R at 8 & 10½ A. M. |
| 17    | ...                   | ...                             | N by E, N W & [N N W  | ...            | 79.1            | B to 7 A. M., \i to 3, \i to 6, B to 11 P. M. Foggy from 5 to 7 A. M.                                                  |
| 18    | 128.3                 | ...                             | N N W & N             | ...            | 79.3            | B to 4 A. M., \i & \i to 5, B to 11 P. M. Slightly foggy from 8 to 11 P. M.                                            |

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning, R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1877.*

**Solar Radiation, Weather, &c.**

| Date. | Max. Solar radiation. | Rain Gauge<br>1½ ft. above<br>Ground. | WIND.                 |                |                 | General aspect of the Sky.                                                                                                       |
|-------|-----------------------|---------------------------------------|-----------------------|----------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------|
|       |                       |                                       | Prevailing direction. | Max. Pressure. | Daily Velocity. |                                                                                                                                  |
|       |                       | Inches                                |                       | lb             | Miles.          |                                                                                                                                  |
| 19    | 129.0                 | ...                                   | N & N by W            | ...            | 69.0            | B to 9 A. M., \i to 5, B to 11 P. M. Slightly foggy at Mid-night & 1 A. M.                                                       |
| 20    | 129.7                 | ...                                   | N & N W               | ...            | 108.5           | B to 6 A. M., \i & \i to 3, O to 11 P. M.                                                                                        |
| 21    | 127.8                 | ...                                   | N W                   | ...            | 130.3           | \i to 7 A. M., B to 2, \i to 11 P. M. Slightly foggy at 10 & 11 P. M.                                                            |
| 22    | 127.7                 | ...                                   | N N E & N E           | ...            | 112.3           | \i to 1, B to 5 A. M., \i to 11 P. M.                                                                                            |
| 23    | ...                   | ...                                   | N W & W by S          | ...            | 103.9           | S to 7, \i to 9 A. M., O to 7, \i to 11 P. M. Slightly foggy from 8 to 11 P. M. D at 10, 11 A. M. & 12 P. M.                     |
| 24    | 129.5                 | ...                                   | W by S & N E          | ...            | 58.9            | B. Slightly foggy from Mid-night to 2 A. M. & at 7 P. M.                                                                         |
| 25    | 129.0                 | ...                                   | N E, N N W & N N E    | ...            | 118.2           | B. Slightly foggy at 10 & 11 P. M.                                                                                               |
| 26    | 126.5                 | ...                                   | N N E, N W & W        | ...            | 102.7           | B to 6, \i to 8 A. M., \i to 4, \i to 6, O to 9, \i to 11 P. M. Slightly foggy at Midnight, 1 A. M. & 11 P. M.                   |
| 27    | 131.0                 | ...                                   | W by N & W            | ...            | 60.4            | \i to 3 A. M., B to 6, \i to 11 P. M. Slightly foggy at Mid-night & from 8 to 11 P. M.                                           |
| 28    | 134.0                 | ...                                   | W & W by S            | ...            | 67.9            | \i to 11 A. M., \i to 7, B to 11 P. M. Slightly foggy at Mid-night & 1 A. M.                                                     |
| 29    | 136.0                 | ...                                   | W by S & S W          | ...            | 48.4            | \i & \i to 9 A. M., \i to 1, \i to 4, \i to 9, B to 11 P. M.                                                                     |
| 30    | 138.0                 | ...                                   | S W & S S W           | ...            | 71.3            | B to 6, \i to 9, \i to 11 A. M., \i to 5, \i to 7, \i to 9, O to 11 P. M. Slightly foggy from 4 to 6 A. M. T, L & R at 11½ P. M. |
| 31    | 134.5                 | 0.87                                  | S W & S S W           | 0.8            | 87.6            | O to 10 A. M., \i to 12, \i to 4, \i to 8, \i to 11 P. M. T & L at Midnight, & 1 A. M. B from Midnight to 5½ A. M.               |

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning, R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surrey General's Office, Calcutta,  
in the month of January 1877.*

MONTHLY RESULTS.

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|                                                                   | Inches. |
|-------------------------------------------------------------------|---------|
| Mean height of the Barometer for the month ... ..                 | 30.096  |
| Max. height of the Barometer occurred at 10 A. M. on the 16th ... | 30.801  |
| Min. height of the Barometer occurred at 4 P. M. on the 31st ...  | 29.008  |
| Extreme range of the Barometer during the month ... ..            | 0.893   |
| Mean of the daily Max. Pressures ... ..                           | 30.171  |
| Ditto ditto Min. ditto ... ..                                     | 30.040  |
| Mean daily range of the Barometer during the month ... ..         | 0.181   |

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|                                                               | °    |
|---------------------------------------------------------------|------|
| Mean Dry Bulb Thermometer for the month ... ..                | 67.7 |
| Max. Temperature occurred at 3 P. M. on the 30th ... ..       | 83.0 |
| Min. Temperature occurred at 7 A. M. on the 1st & 15th ... .. | 57.5 |
| Extreme range of the Temperature during the month ... ..      | 25.5 |
| Mean of the daily Max. Temperature ... ..                     | 76.1 |
| Ditto ditto Min. ditto, ... ..                                | 60.7 |
| Mean daily range of the Temperature during the month ... ..   | 15.4 |

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|                                                                |      |
|----------------------------------------------------------------|------|
| Mean Wet Bulb Thermometer for the month ... ..                 | 62.5 |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...  | 5.2  |
| Computed Mean Dew-point for the month ... ..                   | 58.3 |
| Mean Dry Bulb Thermometer above computed mean Dew-point ... .. | 9.4  |

|                                                   | Inches. |
|---------------------------------------------------|---------|
| Mean Elastic force of Vapour for the month ... .. | 0.494   |

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|                                                                        | Grain. |
|------------------------------------------------------------------------|--------|
| Mean Weight of Vapour for the month ... ..                             | 5.46   |
| Additional Weight of Vapour required for complete saturation ...       | 2.00   |
| Mean degree of humidity for the month, complete saturation being unity | 0.78   |

|                                                            | °     |
|------------------------------------------------------------|-------|
| Mean Max. Solar radiation Thermometer for the month ... .. | 128.4 |

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|                                                                                                      | Inches.      |
|------------------------------------------------------------------------------------------------------|--------------|
| Rained 7 days,—Max. fall of rain during 24 hours ... ..                                              | 1.94         |
| Total amount of rain during the month ... ..                                                         | 2.90         |
| Total amount of rain indicated by the Gauge* attached to the anemo-<br>meter during the month ... .. | out of order |
| Prevailing direction of the Wind ... ..                                                              | N & N W.     |

\* Height 70 feet 10 inches above ground.





*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1877.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | °                             | °                                             | °    | °     |
| 1     | 29.939                                          | 30.001                                    | 29.888  | 0.113   | 72.7                          | 78.0                                          | 69.0 | 9.0   |
| 2     | .901                                            | .023                                      | .920    | .103    | 62.2                          | 69.5                                          | 58.6 | 9.9   |
| 3     | .949                                            | .015                                      | .902    | .113    | 64.5                          | 71.3                                          | 57.8 | 13.5  |
| 4     | .874                                            | .078                                      | .818    | .265    | 61.3                          | 65.0                                          | 56.0 | 9.0   |
| 5     | .883                                            | 29.950                                    | .828    | .122    | 64.2                          | 73.3                                          | 57.8 | 15.5  |
| 6     | .928                                            | .992                                      | .870    | .122    | 66.4                          | 73.0                                          | 61.5 | 11.5  |
| 7     | .926                                            | .986                                      | .845    | .141    | 65.4                          | 75.2                                          | 61.5 | 13.7  |
| 8     | .947                                            | 30.000                                    | .889    | .111    | 68.9                          | 68.5                                          | 60.5 | 8.0   |
| 9     | .993                                            | .050                                      | .933    | .117    | 66.3                          | 73.2                                          | 61.5 | 10.7  |
| 10    | 30.059                                          | .141                                      | 30.005  | .136    | 63.5                          | 71.0                                          | 56.5 | 14.5  |
| 11    | .089                                            | .127                                      | .009    | .118    | 64.1                          | 71.0                                          | 56.0 | 15.0  |
| 12    | .033                                            | .107                                      | 29.981  | .126    | 66.1                          | 73.2                                          | 59.5 | 13.7  |
| 13    | .054                                            | .120                                      | 30.008  | .112    | 66.7                          | 74.4                                          | 59.0 | 15.4  |
| 14    | .129                                            | .192                                      | .062    | .130    | 67.4                          | 74.5                                          | 59.8 | 14.7  |
| 15    | .140                                            | .223                                      | .084    | .139    | 66.8                          | 75.0                                          | 59.6 | 15.4  |
| 16    | .103                                            | .176                                      | .052    | .124    | 66.5                          | 75.2                                          | 58.0 | 17.2  |
| 17    | .111                                            | .187                                      | .054    | .133    | 66.5                          | 76.2                                          | 58.5 | 17.7  |
| 18    | .117                                            | .196                                      | .071    | .125    | 67.1                          | 76.4                                          | 57.8 | 18.6  |
| 19    | .127                                            | .192                                      | .080    | .112    | 67.4                          | 76.2                                          | 60.0 | 16.2  |
| 20    | .131                                            | .206                                      | .068    | .138    | 69.8                          | 78.6                                          | 59.0 | 19.6  |
| 21    | .096                                            | .163                                      | .028    | .135    | 69.9                          | 80.0                                          | 60.2 | 19.8  |
| 22    | .080                                            | .135                                      | .015    | .120    | 72.2                          | 81.4                                          | 63.0 | 18.4  |
| 23    | .028                                            | .110                                      | 29.972  | .138    | 74.0                          | 84.3                                          | 65.7 | 19.1  |
| 24    | .060                                            | .186                                      | 30.011  | .125    | 75.9                          | 84.5                                          | 69.0 | 15.5  |
| 25    | .080                                            | .173                                      | .004    | .169    | 74.6                          | 84.2                                          | 66.5 | 17.7  |
| 26    | .064                                            | .125                                      | .004    | .121    | 73.1                          | 83.2                                          | 63.6 | 19.6  |
| 27    | .085                                            | .119                                      | 29.991  | .128    | 73.3                          | 84.7                                          | 63.5 | 21.2  |
| 28    | .011                                            | .092                                      | .961    | .131    | 75.1                          | 86.0                                          | 66.0 | 20.0  |

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means, are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1877.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon. (Continued)

| Date. | Mean Wet Bulb Ther-<br>mometer | Dry Bulb above Wet | Computed Low Point | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a Cubic foot of air. | Additional Weight of<br>Vapour required for<br>complete saturation. | Mean degree of Humi-<br>dity, complete satu-<br>ration being unity. |
|-------|--------------------------------|--------------------|--------------------|------------------------------|----------------------------------|--------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|       | °                              | °                  | °                  | °                            | Inches                           | Gr.                                              | Gr.                                                                 | .                                                                   |
| 1     | 67.9                           | 4.8                | 64.1               | 3.6                          | 0.599                            | 0.55                                             | 2.13                                                                | 0.76                                                                |
| 2     | 59.2                           | 3.0                | 56.5               | 5.7                          | .465                             | 5.20                                             | 1.09                                                                | .83                                                                 |
| 3     | 60.0                           | 4.5                | 56.1               | 8.1                          | .494                             | .16                                              | .60                                                                 | .76                                                                 |
| 4     | 59.3                           | 2.0                | 57.5               | 3.8                          | .441                             | .39                                              | 0.73                                                                | .88                                                                 |
| 5     | 60.6                           | 3.6                | 57.4               | 6.8                          | .480                             | .33                                              | 1.36                                                                | .80                                                                 |
| 6     | 63.6                           | 2.8                | 61.4               | 5.0                          | .518                             | 6.08                                             | .09                                                                 | .85                                                                 |
| 7     | 62.5                           | 2.9                | 60.2               | 5.2                          | .527                             | 5.85                                             | .10                                                                 | .84                                                                 |
| 8     | 62.4                           | 1.5                | 61.0               | 2.9                          | .541                             | 6.02                                             | 0.61                                                                | .91                                                                 |
| 9     | 62.8                           | 3.5                | 60.0               | 6.3                          | .523                             | 5.80                                             | 1.35                                                                | .81                                                                 |
| 10    | 57.6                           | 5.9                | 52.3               | 11.2                         | .404                             | 4.51                                             | 2.04                                                                | .69                                                                 |
| 11    | 58.2                           | 5.9                | 52.9               | 11.2                         | .412                             | .80                                              | .07                                                                 | .69                                                                 |
| 12    | 60.7                           | 5.4                | 56.4               | 9.7                          | .461                             | 5.11                                             | 1.96                                                                | .72                                                                 |
| 13    | 60.6                           | 6.1                | 55.7               | 11.0                         | .453                             | .02                                              | 2.21                                                                | .69                                                                 |
| 14    | 60.5                           | 6.9                | 55.0               | 12.1                         | .442                             | 4.90                                             | .49                                                                 | .66                                                                 |
| 15    | 59.5                           | 7.2                | 53.7               | 13.1                         | .423                             | .09                                              | .57                                                                 | .65                                                                 |
| 16    | 58.4                           | 8.1                | 51.9               | 14.6                         | .398                             | .41                                              | .78                                                                 | .61                                                                 |
| 17    | 58.0                           | 8.5                | 51.2               | 15.3                         | .389                             | .82                                              | .87                                                                 | .60                                                                 |
| 18    | 59.3                           | 7.8                | 53.1               | 14.0                         | .415                             | .60                                              | .72                                                                 | .63                                                                 |
| 19    | 59.2                           | 8.2                | 52.6               | 14.8                         | .408                             | .51                                              | .88                                                                 | .61                                                                 |
| 20    | 60.0                           | 8.4                | 51.2               | 14.4                         | .431                             | .75                                              | .92                                                                 | .62                                                                 |
| 21    | 62.0                           | 7.0                | 57.3               | 12.6                         | .478                             | 5.25                                             | .73                                                                 | .66                                                                 |
| 22    | 65.6                           | 6.6                | 60.3               | 11.9                         | .528                             | .79                                              | .76                                                                 | .68                                                                 |
| 23    | 67.9                           | 6.1                | 63.6               | 10.4                         | .500                             | 6.44                                             | .80                                                                 | .71                                                                 |
| 24    | 69.7                           | 6.2                | 65.4               | 10.5                         | .626                             | .80                                              | .77                                                                 | .71                                                                 |
| 25    | 65.1                           | 9.5                | 58.4               | 16.2                         | .496                             | 5.40                                             | 3.80                                                                | .59                                                                 |
| 26    | 63.2                           | 9.9                | 55.8               | 17.8                         | .417                             | 4.89                                             | .80                                                                 | .56                                                                 |
| 27    | 63.9                           | 9.4                | 56.4               | 16.9                         | .464                             | 5.06                                             | .78                                                                 | .57                                                                 |
| 28    | 65.6                           | 9.5                | 58.9               | 16.2                         | .504                             | .49                                              | .85                                                                 | .59                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1877.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon

| Hour          | Mean Height of<br>the Barometer at<br>32° Fahr. | Range of the Barometer<br>for each hour during<br>the month |         |         | Mean Dry Bulb<br>Thermometer | Range of the Tempera-<br>ture for each hour<br>during the month. |      |       |
|---------------|-------------------------------------------------|-------------------------------------------------------------|---------|---------|------------------------------|------------------------------------------------------------------|------|-------|
|               |                                                 | Max.                                                        | Min.    | Diff.   |                              | Max.                                                             | Min. | Diff. |
|               | Inches.                                         | Inches.                                                     | Inches. | Inches. | °                            | °                                                                | °    | °     |
| Mid-<br>night | 30.034                                          | 30.152                                                      | 29.809  | 0.251   | 65.0                         | 72.0                                                             | 59.3 | 12.7  |
| 1             | .023                                            | .116                                                        | .891    | .202    | 61.1                         | 71.3                                                             | 56.9 | 12.4  |
| 2             | .012                                            | .136                                                        | .879    | .261    | 63.8                         | 70.5                                                             | 58.4 | 12.1  |
| 3             | .001                                            | .192                                                        | .831    | .298    | 63.3                         | 70.2                                                             | 58.0 | 12.2  |
| 4             | 29.997                                          | .127                                                        | .815    | .312    | 62.7                         | 70.0                                                             | 57.5 | 12.5  |
| 5             | 30.012                                          | .112                                                        | .826    | .316    | 62.1                         | 69.6                                                             | 59.6 | 12.7  |
| 6             | .028                                            | .155                                                        | .831    | .321    | 61.5                         | 69.3                                                             | 56.0 | 13.3  |
| 7             | .040                                            | .169                                                        | .839    | .330    | 61.1                         | 69.7                                                             | 56.5 | 13.2  |
| 8             | .068                                            | .188                                                        | .856    | .312    | 63.2                         | 71.5                                                             | 58.0 | 13.5  |
| 9             | .080                                            | .206                                                        | .860    | .316    | 66.9                         | 73.8                                                             | 59.5 | 14.3  |
| 10            | .101                                            | .223                                                        | .911    | .309    | 69.8                         | 78.4                                                             | 60.5 | 17.9  |
| 11            | .098                                            | .212                                                        | .933    | .279    | 71.7                         | 80.8                                                             | 56.0 | 24.8  |
| Noon          | .068                                            | .188                                                        | .900    | .299    | 73.5                         | 82.5                                                             | 56.6 | 25.9  |
| 1             | .040                                            | .166                                                        | .861    | .302    | 71.3                         | 83.0                                                             | 57.8 | 25.2  |
| 2             | .014                                            | .126                                                        | .839    | .287    | 75.1                         | 81.8                                                             | 59.0 | 25.8  |
| 3             | 29.993                                          | .108                                                        | .813    | .295    | 75.3                         | 81.5                                                             | 58.8 | 26.7  |
| 4             | .985                                            | .106                                                        | .811    | .292    | 71.9                         | 86.0                                                             | 58.6 | 27.4  |
| 5             | .986                                            | .116                                                        | .828    | .287    | 71.2                         | 81.7                                                             | 59.0 | 25.7  |
| 6             | .995                                            | .125                                                        | .848    | .277    | 72.2                         | 82.0                                                             | 59.5 | 22.5  |
| 7             | 30.008                                          | .137                                                        | .871    | .266    | 70.0                         | 78.5                                                             | 60.0 | 18.5  |
| 8             | .027                                            | .151                                                        | .886    | .205    | 68.6                         | 77.0                                                             | 60.4 | 16.6  |
| 9             | .039                                            | .165                                                        | .896    | .269    | 67.4                         | 75.4                                                             | 60.0 | 15.4  |
| 10            | .045                                            | .162                                                        | .901    | .261    | 66.4                         | 71.2                                                             | 59.5 | 14.7  |
| 11            | .043                                            | .162                                                        | .899    | .263    | 65.6                         | 73.0                                                             | 59.5 | 13.5  |

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means, are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1877.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

| Hour.          | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a Cubic foot of air. | Additional Weight of<br>Vapour required for<br>complete saturation. | Mean degree of Humi-<br>dity, complete satura-<br>tion being unity. |
|----------------|---------------------------------|---------------------|--------------------|------------------------------|----------------------------------|--------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|                | °                               | °                   | °                  | °                            | Inches.                          | Gr.                                              | Gr.                                                                 |                                                                     |
| Mid-<br>night. | 61.9                            | 3.1                 | 59.4               | 5.6                          | .513                             | 5.69                                             | 1.18                                                                | 0.88                                                                |
| 1              | 61.6                            | 2.9                 | 58.9               | 5.5                          | .509                             | .60                                              | .14                                                                 | .88                                                                 |
| 2              | 61.0                            | 2.8                 | 58.5               | 5.3                          | .498                             | .54                                              | .07                                                                 | .84                                                                 |
| 3              | 60.5                            | 2.8                 | 58.0               | 5.3                          | .489                             | .45                                              | .06                                                                 | .84                                                                 |
| 4              | 60.0                            | 2.7                 | 57.6               | 5.1                          | .483                             | .39                                              | .00                                                                 | .84                                                                 |
| 5              | 59.5                            | 2.6                 | 57.2               | 4.9                          | .476                             | .32                                              | 0.95                                                                | .85                                                                 |
| 6              | 59.1                            | 2.4                 | 56.9               | 4.6                          | .472                             | .27                                              | .89                                                                 | .86                                                                 |
| 7              | 58.9                            | 2.5                 | 56.6               | 4.8                          | .467                             | .28                                              | .91                                                                 | .85                                                                 |
| 8              | 59.7                            | 3.5                 | 56.5               | 6.7                          | .465                             | .19                                              | 1.80                                                                | .80                                                                 |
| 9              | 61.2                            | 5.7                 | 56.6               | 10.3                         | .467                             | .17                                              | 2.11                                                                | .71                                                                 |
| 10             | 61.9                            | 7.9                 | 55.6               | 14.2                         | .452                             | 4.98                                             | .97                                                                 | .63                                                                 |
| 11             | 62.5                            | 9.2                 | 55.1               | 16.6                         | .444                             | .87                                              | 3.56                                                                | .58                                                                 |
| Noon           | 62.9                            | 10.6                | 55.5               | 18.0                         | .450                             | .92                                              | .98                                                                 | .55                                                                 |
| 1              | 63.3                            | 11.0                | 55.6               | 18.7                         | .452                             | .93                                              | 4.19                                                                | .54                                                                 |
| 2              | 63.5                            | 11.6                | 55.4               | 19.7                         | .449                             | .88                                              | .43                                                                 | .52                                                                 |
| 3              | 63.7                            | 11.6                | 55.6               | 19.7                         | .452                             | .92                                              | .43                                                                 | .52                                                                 |
| 4              | 63.3                            | 11.6                | 55.2               | 19.7                         | .445                             | .85                                              | .43                                                                 | .52                                                                 |
| 5              | 63.4                            | 10.8                | 55.8               | 18.4                         | .455                             | .96                                              | .13                                                                 | .55                                                                 |
| 6              | 63.8                            | 8.4                 | 57.1               | 15.1                         | .475                             | 5.20                                             | 3.85                                                                | .61                                                                 |
| 7              | 63.9                            | 6.1                 | 59.0               | 11.0                         | .506                             | .56                                              | 2.44                                                                | .70                                                                 |
| 8              | 63.6                            | 5.0                 | 59.6               | 9.0                          | .514                             | .70                                              | 1.97                                                                | .74                                                                 |
| 9              | 63.0                            | 4.4                 | 59.5               | 7.9                          | .515                             | .69                                              | .70                                                                 | .77                                                                 |
| 10             | 62.5                            | 3.9                 | 59.4               | 7.0                          | .513                             | .68                                              | .49                                                                 | .79                                                                 |
| 11             | 62.1                            | 3.5                 | 59.3               | 6.3                          | .511                             | .67                                              | .33                                                                 | .81                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1877.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge<br>1½ ft. above<br>Ground. | WIND.                 |               |                 | General aspect of the Sky.                                                                                                                                         |
|-------|-----------------------|---------------------------------------|-----------------------|---------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |                       |                                       | Prevailing direction. | Max. Pressure | Daily Velocity. |                                                                                                                                                                    |
|       |                       | Inches                                |                       | lb            | Miles.          |                                                                                                                                                                    |
| 1     | 184.0                 | ...                                   | S S W & N W           | ...           | 114.0           | ☁ i to 5, B to 8, ☁ i to 10 A.M.,<br>☁ i to 3 A.M., O to 7, B to 11<br>P.M. Slight R after intervals<br>from 5 A.M. to 3 P.M.                                      |
| 2     | ...                   | 0.29                                  | N N E & S             | ...           | 113.6           | ☁ i to 7 A.M., ☁ i to 1, ☁ i to<br>6, S to 11 P.M. D at 11½ P.M.<br>S to 2 A.M., O to 8, S to 11<br>P.M. T at 11 A.M. L at 11 A.M.<br>& 11 P.M. R after intervals. |
| 3     | 185.0                 | ...                                   | S S W & E             | ...           | 41.9            | O to 9 A.M., ☁ i to 12, B to<br>11 P.M. Slightly foggy from 9<br>to 11 P.M.                                                                                        |
| 4     | ...                   | 0.62                                  | E by N & E S E        | 7.9           | 161.0           | B to 8, ☁ i to 6, O to 11 A.M.,<br>☁ i to 3, B to 11 P.M. Light R<br>at 6½, 7½ & 8 A.M.                                                                            |
| 5     | 125.0                 | ...                                   | N N W & N             | ...           | 105.6           | B to 3 A.M., ☁ i to 12, O to<br>4, ☁ i to 6, B to 8, O to 11 P.M.<br>R at 7½ A.M. & from 12½ to 4½<br>& at 11 P.M.                                                 |
| 6     | 134.0                 | 0.05                                  | N by W & E            | ...           | 76.1            | O to 8 A.M., ☁ i to 12, O to<br>4, ☁ i to 6, ☁ i to 11 P.M. Slight<br>R at 4½ from 6½ to 8, at 11 A.M.<br>& 2½ P.M.                                                |
| 7     | 129.0                 | 1.00                                  | E S E & E N E         | 8.0           | 124.6           | ☁ i to 1, B to 9 A.M., ☁ i to 5,<br>B to 11 P.M. Slightly foggy<br>at 9 & 10 P.M.                                                                                  |
| 8     | 86.0                  | 0.30                                  | E by N & N W          | ...           | 199.8           | B. Slightly foggy from 8 to<br>11 P.M.                                                                                                                             |
| 9     | 182.8                 | ...                                   | N W & N               | ...           | 87.8            | B to 11 A.M., ☁ i to 1, ☁ i to<br>3, ☁ i to 6, O to 9, S to 11 P.M.<br>Slightly foggy at Midnight.                                                                 |
| 10    | 126.5                 | ...                                   | N & N by E            | ...           | 143.4           | Chiefly B. Foggy from 9 to<br>11 P.M.                                                                                                                              |
| 11    | 129.0                 | ...                                   | E, N E & W by N       | ...           | 105.0           | B to 1, ☁ i to 8, B to 11 P.M.<br>Slightly foggy at Midnight.                                                                                                      |
| 12    | 127.1                 | ...                                   | W by N & E N E        | ...           | 40.0            |                                                                                                                                                                    |
| 13    | 127.8                 | ...                                   | ENE, NE & NNE         | ...           | 88.4            |                                                                                                                                                                    |
| -     |                       |                                       |                       |               |                 |                                                                                                                                                                    |

☁ i Cirri, — i Strati, ☁ i Cumuli, ☁ i Cirro-strati, ☁ i Cumulo-strati, ☁ i Nimbi,  
☁ i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning,  
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1877.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar<br>radiation.<br>° | Rain Gauge<br>1½ ft. above<br>Ground.<br>Inches | WIND.                       |                  | Daily<br>Velocity.<br>Miles. | General aspect of the Sky.                                             |
|-------|-------------------------------|-------------------------------------------------|-----------------------------|------------------|------------------------------|------------------------------------------------------------------------|
|       |                               |                                                 | Prevailing<br>direction.    | Max.<br>Pressure |                              |                                                                        |
| 14    | 133.5                         | ...                                             | N N E & N N W               | ...              | 111.5                        | B to 3, \i to 7 A. M., B to 1,<br>\i to 5, \i to 8, B to 11 P. M.      |
| 15    | 130.0                         | ...                                             | NNW, NE & NW                | ...              | 99.4                         | B. Slightly foggy from 8 to<br>11 P. M.                                |
| 16    | 131.0                         | ...                                             | N W & W by N                | ...              | 52.8                         | B.                                                                     |
| 17    | 131.0                         | ...                                             | S W & W N W                 | ...              | 76.9                         | B. Foggy from 9 to 11 P. M.                                            |
| 18    | 130.4                         | ...                                             | W N W & S W                 | ...              | 72.3                         | B. Slightly foggy at Mid-<br>night, 1 A. M. 8 & 9 P. M.                |
| 19    | 132.0                         | ...                                             | S W & W N W                 | ...              | 92.3                         | B.                                                                     |
| 20    | 133.0                         | ...                                             | W N W & W by N              | ...              | 66.1                         | B. Slightly foggy from 8 to<br>11 P. M.                                |
| 21    | 133.0                         | ...                                             | W by N & S S W              | ...              | 33.3                         | Chiefly B. Slightly foggy<br>from 7 to 10 P. M.                        |
| 22    | 134.4                         | ...                                             | S by E & S by W             | ...              | 71.9                         | B to 11 A. M., \i to 1, \i to<br>6, \i to 9, B to 11 P. M.             |
| 23    | 140.5                         | ...                                             | S by W & S S W              | ...              | 92.3                         | B to 8, \i to 11 A. M., \i to<br>2, \i to 5, \i to 11 P. M.            |
| 24    | 130.6                         | ...                                             | S by W, S S W &<br>[W by N] | ...              | 98.5                         | \i to 3, \i to 6, \i to 10<br>A. M., B to 2, \i to 4, B to 11<br>P. M. |
| 25    | 136.4                         | ...                                             | N N E & W N W               | ...              | 91.2                         | B. Slightly foggy at Mid-<br>night, 1 A. M. & from 8 to 11 P. M.       |
| 26    | 137.0                         | ...                                             | W N W & N W                 | ...              | 138.3                        | B. Slightly foggy from 8 to<br>10 P. M.                                |
| 27    | 137.8                         | ...                                             | N W & W by N                | ...              | 108.6                        | B.                                                                     |
| 28    | 137.4                         | ...                                             | W by N & W S W              | ...              | 100.8                        | B.                                                                     |

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, ~i Cumulo-strati, \i Nimbi,  
\i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,  
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surrey General's Office, Calcutta,  
in the month of February 1877.*

MONTHLY RESULTS.

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|                                                                  | Inches. |
|------------------------------------------------------------------|---------|
| Mean height of the Barometer for the month ... ..                | 30.082  |
| Max. height of the Barometer occurred at 10 A. M. on the 15th .. | 30.223  |
| Min. height of the Barometer occurred at 3 P. M. on the 4th ..   | 29.813  |
| <i>Extreme range</i> of the Barometer during the month ... ..    | 0.410   |
| Mean of the daily Max. Pressures ... ..                          | 30.108  |
| Ditto ditto Min. ditto ... ..                                    | 29.977  |
| <i>Mean daily range</i> of the Barometer during the month ... .. | 0.131   |

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|                                                                    | °    |
|--------------------------------------------------------------------|------|
| Mean Dry Bulb Thermometer for the month ... ..                     | 68.0 |
| Max. Temperature occurred at 4 P. M. on the 28th ... ..            | 86.0 |
| Min. Temperature occurred at 6 A. M. on the 4th & 11th ... ..      | 56.0 |
| <i>Extreme range</i> of the Temperature during the month ... ..    | 30.0 |
| Mean of the daily Max. Temperature ... ..                          | 76.3 |
| Ditto ditto Min. ditto, ... ..                                     | 60.9 |
| <i>Mean daily range</i> of the Temperature during the month ... .. | 15.4 |

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|                                                                |      |
|----------------------------------------------------------------|------|
| Mean Wet Bulb Thermometer for the month ... ..                 | 62.0 |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...  | 6.0  |
| Computed Mean Dew-point for the month ... ..                   | 57.2 |
| Mean Dry Bulb Thermometer above computed mean Dew-point ... .. | 10.8 |

|                                                   | Inches. |
|---------------------------------------------------|---------|
| Mean Elastic force of Vapour for the month ... .. | 0.476   |

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|                                                                        | Grain. |
|------------------------------------------------------------------------|--------|
| Mean Weight of Vapour for the month ... ..                             | 5.25   |
| Additional Weight of Vapour required for complete saturation ...       | 2.28   |
| Mean degree of humidity for the month, complete saturation being unity | 0.70   |

|                                                            | °     |
|------------------------------------------------------------|-------|
| Mean Max. Solar radiation Thermometer for the month ... .. | 130.7 |

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|                                                                                                 | Inches.     |
|-------------------------------------------------------------------------------------------------|-------------|
| Rained 7 days,—Max. fall of rain during 24 hours ... ..                                         | 1.00        |
| Total amount of rain during the month ... ..                                                    | 2.26        |
| Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... .. | 1.61        |
| Prevailing direction of the Wind ... ..                                                         | W N W & N W |

\* Height 70 feet 10 inches above ground.





*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1877.*

Latitude 22° 33' 1" North. Longitude 88° 20' 31" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | °                             | °                                             | °    | °     |
| 1     | 30.005                                          | 30.072                                    | 29.949  | 0.123   | 76.0                          | 87.0                                          | 66.0 | 21.0  |
| 2     | 29.975                                          | .052                                      | .923    | .129    | 76.5                          | 87.0                                          | 67.0 | 20.0  |
| 3     | 30.000                                          | .078                                      | .942    | .136    | 77.7                          | 88.0                                          | 67.5 | 20.5  |
| 4     | 29.920                                          | 29.983                                    | .843    | .145    | 77.5                          | 86.5                                          | 69.0 | 17.5  |
| 5     | .864                                            | .929                                      | .787    | .142    | 78.3                          | 86.5                                          | 73.5 | 13.0  |
| 6     | .880                                            | .942                                      | .804    | .138    | 79.2                          | 88.5                                          | 73.5 | 15.0  |
| 7     | .918                                            | .996                                      | .854    | .142    | 77.9                          | 88.0                                          | 68.5 | 19.5  |
| 8     | .934                                            | 30.004                                    | .860    | .144    | 79.0                          | 88.5                                          | 71.0 | 17.5  |
| 9     | .906                                            | 29.973                                    | .847    | .126    | 79.1                          | 87.2                                          | 71.5 | 15.7  |
| 10    | .880                                            | .947                                      | .798    | .149    | 80.1                          | 90.0                                          | 74.0 | 16.0  |
| 11    | .882                                            | .948                                      | .880    | .118    | 79.3                          | 88.8                                          | 71.5 | 17.3  |
| 12    | .905                                            | .967                                      | .864    | .103    | 80.0                          | 89.5                                          | 73.5 | 16.0  |
| 13    | .964                                            | 30.066                                    | .905    | .161    | 81.0                          | 88.5                                          | 76.2 | 12.3  |
| 14    | .984                                            | .027                                      | .899    | .128    | 81.5                          | 92.2                                          | 71.5 | 20.7  |
| 15    | .952                                            | .000                                      | .905    | .095    | 81.2                          | 90.5                                          | 74.6 | 15.9  |
| 16    | .944                                            | 29.999                                    | .905    | .094    | 76.9                          | 84.2                                          | 72.5 | 11.7  |
| 17    | .954                                            | 30.032                                    | .874    | .158    | 73.8                          | 83.0                                          | 66.5 | 16.5  |
| 18    | .933                                            | 29.986                                    | .854    | .132    | 77.3                          | 86.0                                          | 70.0 | 16.0  |
| 19    | .910                                            | .980                                      | .832    | .148    | 79.0                          | 88.0                                          | 71.8 | 16.2  |
| 20    | .868                                            | .929                                      | .791    | .136    | 80.7                          | 89.0                                          | 74.0 | 15.0  |
| 21    | 11.804                                          | .871                                      | .789    | .132    | 81.7                          | 90.0                                          | 76.0 | 14.0  |
| 22    | .778                                            | .836                                      | .725    | .111    | 83.4                          | 93.9                                          | 76.0 | 17.9  |
| 23    | .838                                            | .923                                      | .765    | .158    | 83.8                          | 93.8                                          | 77.0 | 16.8  |
| 24    | .863                                            | .949                                      | .801    | .148    | 83.1                          | 92.9                                          | 77.0 | 15.9  |
| 25    | .873                                            | .951                                      | .802    | .149    | 80.5                          | 88.0                                          | 76.4 | 11.6  |
| 26    | .878                                            | .953                                      | .807    | .146    | 81.3                          | 90.5                                          | 74.5 | 16.0  |
| 27    | .856                                            | .938                                      | .783    | .155    | 81.9                          | 90.0                                          | 76.4 | 13.6  |
| 28    | .837                                            | .957                                      | .772    | .185    | 78.3                          | 80.5                                          | 75.8 | 4.7   |
| 29    | .812                                            | .890                                      | .763    | .127    | 83.1                          | 92.2                                          | 76.3 | 15.9  |
| 30    | .822                                            | .949                                      | .836    | .118    | 78.3                          | 85.5                                          | 71.0 | 14.5  |
| 31    | .917                                            | 30.016                                    | .839    | .177    | 76.3                          | 81.2                                          | 74.0 | 7.2   |

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means, are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1877.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>vapour. | Mean Weight of Vapour<br>in a Cubic foot of air. | Additional Weight of<br>Vapour required for<br>complete saturation. | Mean degree of Humi-<br>dity, complete satu-<br>ration being unity. |
|-------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|       | °                               | °                   | °                   | °                            | Inches.                          | Gr.                                              | Gr.                                                                 |                                                                     |
| 1     | 64.9                            | 11.1                | 57.1                | 18.9                         | 0.475                            | 5.16                                             | 4.44                                                                | 0.54                                                                |
| 2     | 65.5                            | 11.0                | 57.8                | 18.7                         | .486                             | .27                                              | .48                                                                 | .54                                                                 |
| 3     | 66.8                            | 10.9                | 59.2                | 18.5                         | .509                             | .51                                              | .59                                                                 | .55                                                                 |
| 4     | 68.0                            | 9.5                 | 61.3                | 16.2                         | .548                             | .92                                              | .12                                                                 | .59                                                                 |
| 5     | 71.6                            | 6.7                 | 66.9                | 11.4                         | .657                             | 7.12                                             | 3.16                                                                | .69                                                                 |
| 6     | 73.4                            | 5.8                 | 69.3                | 9.9                          | .711                             | .67                                              | 2.89                                                                | .73                                                                 |
| 7     | 70.6                            | 7.3                 | 65.5                | 12.4                         | .628                             | 6.81                                             | 3.35                                                                | .67                                                                 |
| 8     | 72.8                            | 6.2                 | 68.5                | 10.5                         | .692                             | 7.48                                             | .02                                                                 | .71                                                                 |
| 9     | 74.6                            | 4.5                 | 71.4                | 7.7                          | .761                             | 8.22                                             | 2.81                                                                | .78                                                                 |
| 10    | 75.5                            | 4.6                 | 72.3                | 7.9                          | .783                             | .44                                              | .40                                                                 | .78                                                                 |
| 11    | 74.4                            | 4.9                 | 71.0                | 8.3                          | .751                             | .12                                              | .47                                                                 | .77                                                                 |
| 12    | 75.3                            | 4.7                 | 72.0                | 8.0                          | .776                             | .36                                              | .45                                                                 | .77                                                                 |
| 13    | 72.9                            | 8.1                 | 67.2                | 13.8                         | .664                             | 7.14                                             | 4.00                                                                | .64                                                                 |
| 14    | 71.8                            | 10.2                | 64.2                | 17.3                         | .601                             | 6.46                                             | .85                                                                 | .57                                                                 |
| 15    | 71.2                            | 10.0                | 64.2                | 17.0                         | .601                             | .46                                              | .75                                                                 | .58                                                                 |
| 16    | 69.5                            | 7.4                 | 64.3                | 12.6                         | .608                             | .55                                              | 3.31                                                                | .60                                                                 |
| 17    | 66.8                            | 7.0                 | 61.9                | 11.9                         | .557                             | .08                                              | 2.90                                                                | .68                                                                 |
| 18    | 71.4                            | 5.9                 | 67.3                | 10.0                         | .666                             | 7.22                                             | .76                                                                 | .72                                                                 |
| 19    | 72.5                            | 6.5                 | 67.9                | 11.1                         | .679                             | .34                                              | 3.16                                                                | .70                                                                 |
| 20    | 75.6                            | 5.1                 | 72.0                | 8.7                          | .776                             | 8.35                                             | 2.69                                                                | .76                                                                 |
| 21    | 77.4                            | 4.3                 | 74.4                | 7.3                          | .828                             | 9.02                                             | .35                                                                 | .79                                                                 |
| 22    | 77.4                            | 6.0                 | 73.2                | 10.2                         | .806                             | 8.64                                             | 3.22                                                                | .72                                                                 |
| 23    | 77.6                            | 6.2                 | 73.3                | 10.5                         | .809                             | .65                                              | .45                                                                 | .72                                                                 |
| 24    | 77.6                            | 6.5                 | 72.0                | 11.1                         | .776                             | .31                                              | .55                                                                 | .70                                                                 |
| 25    | 75.0                            | 5.5                 | 71.1                | 9.4                          | .753                             | .13                                              | 2.85                                                                | .74                                                                 |
| 26    | 73.9                            | 8.4                 | 67.0                | 14.3                         | .659                             | 7.10                                             | 4.14                                                                | .68                                                                 |
| 27    | 77.1                            | 4.8                 | 78.7                | 8.2                          | .819                             | 8.82                                             | 2.62                                                                | .77                                                                 |
| 28    | 73.9                            | 4.4                 | 70.8                | 7.5                          | .748                             | .07                                              | .21                                                                 | .79                                                                 |
| 29    | 73.3                            | 9.8                 | 66.4                | 16.7                         | .646                             | 6.93                                             | 4.93                                                                | .68                                                                 |
| 30    | 71.9                            | 6.4                 | 67.4                | 10.9                         | .668                             | 7.23                                             | 3.05                                                                | .70                                                                 |
| 31    | 70.5                            | 5.8                 | 66.4                | 9.9                          | .646                             | 08                                               | 2.66                                                                | .73                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1877.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer at<br>32° Fahr. | Range of the Barometer<br>for each hour during<br>the month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture for each hour<br>during the month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|------------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                             | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | °                             | °                                                                | °    | °     |
| Mid-<br>night. | 29.909                                          | 30.024                                                       | 29.786  | 0.238   | 75.0                          | 70.2                                                             | 71.5 | 7.7   |
| 1              | .901                                            | .018                                                         | .782    | .236    | 74.0                          | 70.0                                                             | 66.5 | 12.5  |
| 2              | .890                                            | .008                                                         | .772    | .236    | 74.4                          | 78.8                                                             | 67.0 | 11.8  |
| 3              | .880                                            | 29.998                                                       | .760    | .238    | 73.9                          | 78.3                                                             | 66.8 | 11.5  |
| 4              | .872                                            | .990                                                         | .742    | .218    | 73.7                          | 78.0                                                             | 66.6 | 11.4  |
| 5              | .865                                            | .998                                                         | .750    | .248    | 73.3                          | 77.8                                                             | 66.6 | 11.2  |
| 6              | .902                                            | 30.014                                                       | .760    | .254    | 72.9                          | 77.5                                                             | 66.4 | 11.1  |
| 7              | .923                                            | .039                                                         | .785    | .248    | 73.2                          | 78.0                                                             | 66.0 | 12.0  |
| 8              | .949                                            | .050                                                         | .808    | .248    | 75.4                          | 79.5                                                             | 68.5 | 11.0  |
| 9              | .964                                            | .078                                                         | .828    | .250    | 78.8                          | 83.5                                                             | 70.8 | 12.7  |
| 10             | .964                                            | .077                                                         | .832    | .245    | 81.3                          | 86.0                                                             | 74.0 | 12.0  |
| 11             | .965                                            | .068                                                         | .836    | .232    | 84.0                          | 89.5                                                             | 78.0 | 11.5  |
| Noon           | .984                                            | .044                                                         | .811    | .233    | 85.9                          | 92.5                                                             | 77.6 | 14.9  |
| 1              | .906                                            | .018                                                         | .782    | .231    | 87.0                          | 93.7                                                             | 78.0 | 15.7  |
| 2              | .881                                            | 29.984                                                       | .766    | .218    | 87.3                          | 93.9                                                             | 72.5 | 21.4  |
| 3              | .858                                            | .959                                                         | .746    | .213    | 87.5                          | 93.0                                                             | 75.2 | 18.4  |
| 4              | .843                                            | .949                                                         | .734    | .215    | 87.2                          | 93.8                                                             | 78.2 | 15.6  |
| 5              | .841                                            | .954                                                         | .725    | .229    | 86.0                          | 91.7                                                             | 78.5 | 13.2  |
| 6              | .853                                            | .949                                                         | .727    | .222    | 83.7                          | 89.2                                                             | 76.5 | 12.7  |
| 7              | .868                                            | .962                                                         | .742    | .220    | 80.9                          | 85.0                                                             | 75.3 | 9.7   |
| 8              | .886                                            | .977                                                         | .766    | .211    | 79.2                          | 83.5                                                             | 74.5 | 9.0   |
| 9              | .907                                            | .999                                                         | .784    | .215    | 78.0                          | 82.4                                                             | 74.0 | 8.4   |
| 10             | .922                                            | 30.008                                                       | .796    | .212    | 77.1                          | 81.0                                                             | 73.0 | 8.0   |
| 11             | .919                                            | .016                                                         | .794    | .222    | 76.2                          | 80.0                                                             | 72.0 | 8.0   |

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means, are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1877.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

| Hour.          | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a Cubic foot of air. | Additional Weight of<br>Vapour required for<br>complete saturation. | Mean degree of Humi-<br>dity, complete satura-<br>tion being unity. |
|----------------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|                | °                               | °                   | °                   | °                            | Inches.                          | Gr.                                              | Gr.                                                                 |                                                                     |
| Mid-<br>night. |                                 |                     |                     |                              |                                  |                                                  |                                                                     |                                                                     |
|                | 71.8                            | 8.8                 | 69.1                | 6.5                          | 0.706                            | 7.67                                             | 1.81                                                                | 0.81                                                                |
| 1              | 71.4                            | 8.5                 | 68.9                | 6.0                          | .701                             | .65                                              | .68                                                                 | .82                                                                 |
| 2              | 71.2                            | 8.2                 | 69.0                | 5.4                          | .704                             | .68                                              | .47                                                                 | .84                                                                 |
| 3              | 70.9                            | 8.0                 | 68.8                | 5.1                          | .699                             | .68                                              | .38                                                                 | .85                                                                 |
| 4              | 70.8                            | 2.9                 | 68.8                | 4.9                          | .699                             | .68                                              | .33                                                                 | .85                                                                 |
| 5              | 70.7                            | 2.6                 | 68.6                | 4.7                          | .695                             | .69                                              | .25                                                                 | .86                                                                 |
| 6              | 70.5                            | 2.4                 | 68.6                | 4.3                          | .695                             | .61                                              | .12                                                                 | .87                                                                 |
| 7              | 70.9                            | 2.3                 | 69.1                | 4.1                          | .706                             | .72                                              | .10                                                                 | .88                                                                 |
| 8              | 71.9                            | 3.5                 | 69.4                | 6.0                          | .718                             | .77                                              | .66                                                                 | .82                                                                 |
| 9              | 72.8                            | 6.0                 | 68.6                | 10.2                         | .695                             | .52                                              | 2.92                                                                | .72                                                                 |
| 10             | 73.1                            | 8.2                 | 67.4                | 13.9                         | .668                             | .18                                              | 4.06                                                                | .64                                                                 |
| 11             | 73.7                            | 10.3                | 66.5                | 17.5                         | .648                             | 6.98                                             | 5.24                                                                | .57                                                                 |
| Noon.          |                                 |                     |                     |                              |                                  |                                                  |                                                                     |                                                                     |
|                | 73.9                            | 12.0                | 65.5                | 20.4                         | .628                             | .70                                              | 6.17                                                                | .52                                                                 |
| 1              | 73.7                            | 13.3                | 65.7                | 21.3                         | .632                             | .73                                              | .56                                                                 | .51                                                                 |
| 2              | 73.5                            | 13.8                | 65.2                | 22.1                         | .621                             | .61                                              | .80                                                                 | .49                                                                 |
| 3              | 73.7                            | 13.9                | 65.4                | 22.1                         | .626                             | .64                                              | .55                                                                 | .49                                                                 |
| 4              | 73.9                            | 13.3                | 65.9                | 21.3                         | .636                             | .76                                              | .61                                                                 | .51                                                                 |
| 5              | 74.1                            | 11.9                | 65.8                | 20.2                         | .634                             | .76                                              | .18                                                                 | .52                                                                 |
| 6              | 74.2                            | 9.5                 | 67.5                | 16.2                         | .670                             | 7.18                                             | 4.69                                                                | .60                                                                 |
| 7              | 73.6                            | 7.3                 | 68.5                | 12.4                         | .692                             | .47                                              | 3.63                                                                | .67                                                                 |
| 8              | 73.2                            | 6.0                 | 69.0                | 10.2                         | .704                             | .60                                              | 2.96                                                                | .72                                                                 |
| 9              | 72.6                            | 5.4                 | 68.9                | 9.2                          | .699                             | .57                                              | .62                                                                 | .74                                                                 |
| 10             | 72.2                            | 4.9                 | 68.6                | 8.3                          | .699                             | .59                                              | .32                                                                 | .77                                                                 |
| 11             | 72.1                            | 4.1                 | 69.2                | 7.0                          | .708                             | .70                                              | 1.96                                                                | .50                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1877.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge<br>1½ ft. above<br>Ground. | WIND.                 |                |                 | General aspect of the Sky.                                                                                         |
|-------|-----------------------|---------------------------------------|-----------------------|----------------|-----------------|--------------------------------------------------------------------------------------------------------------------|
|       |                       |                                       | Prevailing direction. | Max. Pressure. | Daily Velocity. |                                                                                                                    |
|       |                       | Inches.                               |                       | lb.            | Miles.          |                                                                                                                    |
| 1     | 138.5                 | ...                                   | W S W & N W           | ...            | 97.9            | B to 4, \i to 7, B to 11 p. m.                                                                                     |
| 2     | 140.5                 | ...                                   | W N W & S W           | ...            | 111.5           | \i to 5, \i to 7 a. m., B to 11 p. m.                                                                              |
| 3     | 142.0                 | ...                                   | N & S W               | ...            | 104.2           | B to 7, \i to 9 a. m., B to 1, \i to 6, B to 11 p. m.                                                              |
| 4     | 141.5                 | ...                                   | S W                   | ...            | 82.8            | B to 7 a. m., \i to 8, S to 11 p. m.                                                                               |
| 5     | 144.0                 | ...                                   | S W & S S W           | ...            | 102.2           | S to 6, O to 8, \i to 11 a. m., \i to 5, B to 11 p. m.                                                             |
| 6     | 141.7                 | 0.03                                  | S by W & S S W        | 1.6            | 179.5           | O to 7 a. m., \i to 4, B to 6, S to 11 p. m. L from 6½ to 11 p. m. T at 7½, 10 & 11 p. m. Light R at 8 & 10½ p. m. |
| 7     | 142.0                 | ...                                   | S S E & N W           | ...            | 204.0           | \i to 4, B to 11 p. m. L at Midnight, D at 7 & 8 a. m.                                                             |
| 8     | 144.0                 | ...                                   | S S E & S by W        | ...            | 116.5           | B to 9, \i to 11 a. m., \i to 9, B to 11 p. m. Foggy from 3 to 7 a. m.                                             |
| 9     | 142.5                 | ...                                   | S S W & S             | ...            | 148.4           | B to 4, S to 8 a. m., \i to 4, B to 11 p. m. Foggy at 6 & 7 a. m.                                                  |
| 10    | 144.0                 | 0.02                                  | S & S S W             | ...            | 181.2           | B to 10 a. m., \i to 3, \i to 4, O to 7, \i to 11 p. m. T at 5½ p. m. L from 5½ to 10 p. m. Light R at 6 p. m.     |
| 11    | 146.0                 | ...                                   | S by E & S S W        | ...            | 191.9           | B to 6, \i to 9 a. m., \i to 6, B to 11 p. m. Sheet L at 1 & 2 a. m., & from 7 to 9 p. m.                          |
| 12    | 143.0                 | ...                                   | S by W & S S W        | ...            | 195.5           | B to 10 a. m., \i to 7, B to 11 p. m. Sheet L on N W at 7 p. m.                                                    |
| 13    | 144.7                 | ...                                   | S by W & W S W        | 1.0            | 164.5           | S to 3, \i to 6, \i to 11 a. m., \i to 6, B to 11 p. m.                                                            |
| 14    | 143.0                 | ...                                   | W S W & W by N        | ...            | 142.4           | \i to 1 a. m., B to 1, \i to 6, B to 11 p. m.                                                                      |
| 15    | 145.5                 | ...                                   | WSW, SW & NW          | ...            | 127.5           | B to 6, \i to 7 a. m., \i to 3, \i to 6, S to 11 p. m.                                                             |

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning,  
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1877.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge<br>1½ ft. above<br>Ground. | WIND.                 |                |                 | General aspect of the Sky.                                                                                          |
|-------|-----------------------|---------------------------------------|-----------------------|----------------|-----------------|---------------------------------------------------------------------------------------------------------------------|
|       |                       |                                       | Prevailing direction. | Max. Pressure. | Daily Velocity. |                                                                                                                     |
|       |                       | Inches                                |                       | H.             | Miles.          |                                                                                                                     |
| 16    | 140.0                 | ...                                   | Variable              | ...            | 139.2           | O to 10 A. M., \i to 12, O to 5, \i to 7, S to 11 P. M. Sheet L from 7 to 11 P. M. D at 6 A. M. & 8½ P. M.          |
| 17    | 139.5                 | 0.70                                  | ...                   | 40.0           | 158.5           | O to 4, B to 9 A. M., \i to 1, B to 11 P. M. T. L & hailstone at Midnight. R at Midnight & 1 A. M.                  |
| 18    | 143.0                 | ...                                   | ...                   | ...            | 82.4            | B to 8 A. M., \i to 6, B to 11 P. M.                                                                                |
| 19    | 149.0                 | ...                                   | S S W & S by W        | ...            | 114.0           | B to 8 A. M., \i to 6, B to 11 P. M.                                                                                |
| 20    | 146.0                 | ...                                   | S by W & S            | ...            | 131.0           | B to 8 A. M., \i to 4, B to 11 P. M. D at 4 P. M.                                                                   |
| 21    | 142.0                 | ...                                   | S by W, SSW & S       | 0.8            | 255.0           | Chiefly B.                                                                                                          |
| 22    | 146.3                 | ...                                   | S by W & SSW          | 0.2            | 250.2           | B to 9 A. M., \i to 2, \i to 5, B to 11 P. M.                                                                       |
| 23    | 143.0                 | ...                                   | S S W & S W           | ...            | 244.3           | B to 5, \i to 6, \i to 11 A. M., B to 1, \i to 4, B to 11 P. M.                                                     |
| 24    | 144.8                 | ...                                   | S S W & S W           | 9.5            | 186.6           | B to 5, Scuds to 9 A. M., \i to 1, B to 8, \i to 7, O to 11 P. M. L at 8 & 9 P. M. T at 9 P. M., D at 10 & 11 P. M. |
| 25    | 147.5                 | ...                                   | S S W & S W           | 0.2            | 164.9           | O to 1, S to 6 A. M., \i to 12, S to 4, O to 6, \i to 11 P. M. D at Midnight, & 8½ P. M.                            |
| 26    | 143.0                 | ...                                   | S by W                | ...            | 150.8           | \i to 11 A. M., B to 2, \i to 7, \i to 11 P. M.                                                                     |
| 27    | 147.0                 | ...                                   | S by W & SSW          | ...            | 97.7            | \i to 6, O to 10 A. M., \i to 5, \i to 11 P. M.                                                                     |
| 28    | 127.0                 | ...                                   | S S W                 | ...            | 85.4            | \i to 6 A. M., O to 8, \i to 11 P. M. D at 8, 10 A. M., 12 & 1 P. M.                                                |
| 29    | 143.2                 | ...                                   | S S W & W             | ...            | 111.3           | \i to 4, O to 6, \i to 11 A. M., B to 2, \i to 7, \i to 11 P. M. Sheet L on S W at 7½ P. M. D at 9½ P. M.           |

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, ~ : Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1877:*

Solar Radiation, Weather, &c.,

| Date. | Max. Solar radiation. | Rain Gauge<br>1½ ft. above<br>Ground. | WIND.                 |               |                 | General aspect of the Sky.                                                                                                                |
|-------|-----------------------|---------------------------------------|-----------------------|---------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------|
|       |                       |                                       | Prevailing direction. | Max. Pressure | Daily Velocity. |                                                                                                                                           |
|       |                       | Inches.                               |                       | in            | Miles.          |                                                                                                                                           |
| 30    | 146.0                 | 0.12                                  | S & S S W             | 6.3           | 144.2           | O to 10 A. M., ~i to 1, O to 3, ~i to 8, O to 11 P. M. T at 1 & 2 A. M., L from 1 to 3 A. M. & at 9 & 10 P. M. Slight R from 1 to 3 A. M. |
| 31    | 128.0                 | 0.01                                  | S S W & S E           | 6.2           | 152.2           | O to 9 A. M., ~i to 12, O to 2, ~i to 5, O to 11 P. M. T at 9 P. M. L from 8 to 11 P. M. Light R at 3, 9½ A. M. & 1½ P. M.                |

~i Cirri —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi.  
~i Cirro-cumuli, B clear, S stratozi, O overcast, T thunder, L lightning.  
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1877.*

## MONTHLY RESULTS.

|                                                                  | Inches. |
|------------------------------------------------------------------|---------|
| Mean height of the Barometer for the month ... ..                | 29.900  |
| Max. height of the Barometer occurred at 9 A. M. on the 3rd ...  | 30.078  |
| Min. height of the Barometer occurred at 5 P. M. on the 22nd ... | 29.725  |
| Extreme range of the Barometer during the month ...              | 0.353   |
| Mean of the daily Max. Pressures ... ..                          | 29.973  |
| Ditto ditto Min. ditto ... ..                                    | 29.835  |
| Mean daily range of the Barometer during the month ...           | 0.188   |

|                                                          | °    |
|----------------------------------------------------------|------|
| Mean Dry Bulb Thermometer for the month ... ..           | 79.5 |
| Max. Temperature occurred at 2 P. M. on the 22nd ... ..  | 93.9 |
| Min. Temperature occurred at 7 A. M. on the 1st ... ..   | 66.0 |
| Extreme range of the Temperature during the month ... .. | 27.9 |
| Mean of the daily Max. Temperature ... ..                | 86.2 |
| Ditto ditto Min. ditto, ... ..                           | 72.7 |
| Mean daily range of the Temperature during the month ... | 15.5 |

|                                                               |      |
|---------------------------------------------------------------|------|
| Mean Wet Bulb Thermometer for the month ... ..                | 72.5 |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ... | 7.0  |
| Computed Mean Dew-point for the month ... ..                  | 67.6 |
| Mean Dry Bulb Thermometer above computed mean Dew-point ...   | 11.9 |

|                                                   | Inches. |
|---------------------------------------------------|---------|
| Mean Elastic force of Vapour for the month ... .. | 0.672   |

|                                                                        | Grain. |
|------------------------------------------------------------------------|--------|
| Mean Weight of Vapour for the month ... ..                             | 7.26   |
| Additional Weight of Vapour required for complete saturation ...       | 8.40   |
| Mean degree of humidity for the month, complete saturation being unity | 0.68   |

|                                                            | °     |
|------------------------------------------------------------|-------|
| Mean Max. Solar radiation Thermometer for the month ... .. | 142.5 |

|                                                                                                      | Inches.        |
|------------------------------------------------------------------------------------------------------|----------------|
| Rained 12 days.—Max. fall of rain during 24 hours ... ..                                             | 0.76           |
| Total amount of rain during the month ... ..                                                         | 0.22           |
| Total amount of rain indicated by the Gauge* attached to the anemo-<br>meter during the month ... .. | 0.58           |
| Prevailing direction of the Wind ... ..                                                              | S S W & S by W |

\* Height 70 feet 10 inches above ground.



*Abstract of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of Mch. 1877.*

### MONTHLY RESULTS.

Tables showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]